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Advance EFFIS Report on Forest Fires in Europe, Middle East and North Africa 2018

2019

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Title Advance EFFIS Report on Forest Fires in Europe, Middle East and North Africa 2018

Abstract

This report contains an anticipated annual summary of the fire season of 2018 with an analysis of fire danger and areas mapped in the European Forest Fire Information System (EFFIS). This report precedes that to be published in August/September 2019, which will include detailed reports prepared by countries in the Expert Group on Forest Fires.

Cover image: NASA Earth Observatory images by Lauren Dauphin and Joshua Stevens, using MODIS data from LANCE/EOSDIS Rapid Response and the Level 1 and Atmospheres Active Distribution System (LAADS).

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1 The European Forest Fire Information System (EFFIS)

The European Forest Fire Information System (EFFIS) has been established jointly by the European Commission services (DG ENV and JRC) and the relevant fire services in the EU Member States and European countries (Forest Services and Civil Protection services). Research activities for the development of the system initiated at JRC in 1998 and the first EFFIS operations were in the year 2000.

In 2003, EFFIS was embedded in the new Regulation (EC) No 2152/2003 (Forest Focus) of the European Council and Parliament on monitoring of forests and environmental interactions until it expired in 2006. Since then EFFIS operated as a voluntary system of information on wildfires until 2015, when it became part of the EU Copernicus program, under the Emergency Management Services.

Acting as the focal point of information on forest fires, EFFIS supports the national services in charge wildfire management. Currently, the EFFIS network is made of 40 countries in Europe, Middle East and North Africa. EFFIS provides specific support to the Emergency Response Centre (ERCC) (formerly Monitoring and Information Centre (MIC)) of Civil Protection as regards near-real time information on wildfires during the fire campaigns and assists other DGs through the provision both pre-fire and post-fire information on wildfire regimes and impacts. It provides information that supports the needs of the European Parliament with regards to wildfire management, impact in natural protected areas and harmonized information on forest fires in the EU.

EFFIS also centralises the national fire data that the countries collect through their national forest fire programmes in the so-called EFFIS Fire Database. The EFFIS web services[1] allow users to access near-real time and historical information on wildfires in Europe, Middle East and North Africa.

EFFIS provides a continuous monitoring of the fire situation in Europe and the Mediterranean area, and regularly sends updates to EC services during the main fire season. The information about the on-going fire season is continuously updated on the EFFIS web site (up to 3 times, daily), which can be interactively queried[2]. EFFIS provides daily meteorological fire danger maps and forecasts of fire danger up to 10 days in advance, updated maps of the latest active fires, wildfire perimeters and post-fire evaluation of damage.

The EFFIS module for the assessment of meteorological forest fire danger is the EFFIS Danger Forecast. This module forecasts forest fire danger in Europe, part of North Africa and the Middle East, on the basis of the Canadian Fire Weather Index (FWI), allowing a harmonized evaluation to be made of the forest fire danger situation throughout Europe and neighbouring countries.

The damage caused by forest fires in Europe and neighbouring countries is estimated using the EFFIS Rapid Damage Assessment module. Since 2000, cartography of the burned areas is produced every year through the processing of satellite imagery. In the year 2003, due to the availability of daily satellite imagery from the MODIS sensor on board the TERRA and AQUA satellites, the RDA provided frequent updates of the total burnt area in Europe. In 2007, the RDA was updated twice a day and currently, since 2016, it is updated 3 times a day. Further to the mapping of burnt areas, the analysis of which types of land cover classes are affected by fires is performed. This module uses MODIS satellite imagery with a ground spatial resolution of about 250 metres, which permits the mapping of fires of around 30 ha or larger. The burned area mapped by EFFIS corresponds, on average, to around 75% to 80% of the total area burnt in Europe each year.

[1] http://effis.jrc.ec.europa.eu

[2] see http://effis.jrc.ec.europa.eu/current-situation

1.1 EFFIS Danger Forecast: 2018 results

The EFFIS Danger Forecast was developed to support the Commission's Directorate-General for the Environment and the forest fire-fighting services in the EU Member States. From 2002, at the request of the Member States, operation of the EFFIS Danger Forecast was extended to six months starting on 1 May and ending on 31 October, and in 2006 to nine months, from 1 February to 31 October. From 2008 the EFFIS Danger Forecast system has run continuously throughout the year without interruption.

The geographic extent has been enlarged over the years from the initial extent that covered only the Mediterranean region. Now the system covers the whole of Europe and MENA (Middle East & North Africa) countries.

The meteorological data used to run the model has also changed during the years. At the beginning the system started using forecasted data provided by MeteoFrance with a spatial resolution of around 50 km. Then over time other providers were included, such as DWD (Deutscher Wetterdienst) and ECMWF (European Centre for Medium-Range Weather Forecast) and the resolution has improved. Now the system runs with three different data sets from three providers: ECMWF (the primary), Meteo France and DWD; with a spatial resolution in a range from around 10 km to 25 km.

In this chapter the fire danger trends assessed by EFFIS in the different countries during the 2018 fire season are presented, comparing them with previous years.

Through the Danger Forecast module of EFFIS the situation has been continuously monitored and the risk level analysed and mapped.

The following figures show fire danger through 2018 as determined by the average FWI values assessed during the fire season in the individual countries.

In 2018 the many of the northern countries experienced unusually high FWI values in spring and summer, while the southern countries had values in line with their average for most of the year.

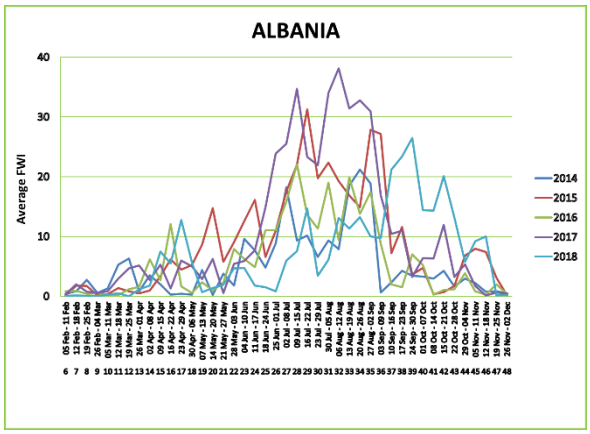
The graphs show the weekly averages of FWI over entire countries; therefore local peaks might have been flattened, especially in those countries such as France or Italy, where there are strong differences in fire danger level with changing latitudes; nevertheless the general trend is depicted providing relevant information about the fire danger level and trends of the year.

To allow a better comparison with past seasons, the curves of 2015-2017 are presented in conjunction with 2018 for all countries.

The countries analysed are those participating in the EFFIS network for which data are available, and are presented in alphabetic order within the two groups (European countries and MENA countries) in the graphs that follow.

NOTE: In order to make the graphs more readable, 4 colour-coded scales have been used to present the FWI: **0-30** for the most northern countries where fire danger rarely reaches high levels; **0-40** for central countries, **0-50** for the Mediterranean and Turkey, and **0-60** for the MENA countries.

NB. *It is notable that the scale for northern countries has had to be increased from 0-20 to 0-30 to accommodate the high values seen in 2018 in these areas.*


ALBANIA
Average FWI
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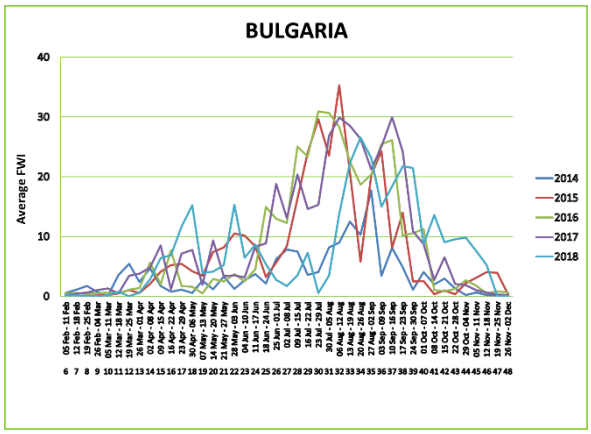
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Average FWI
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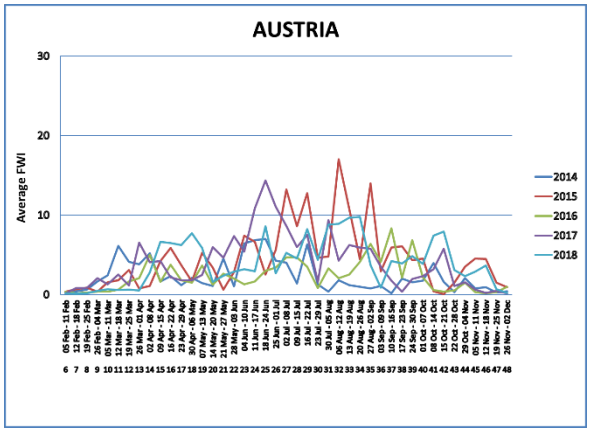
2018


AUSTRIA
Average FWI
2014
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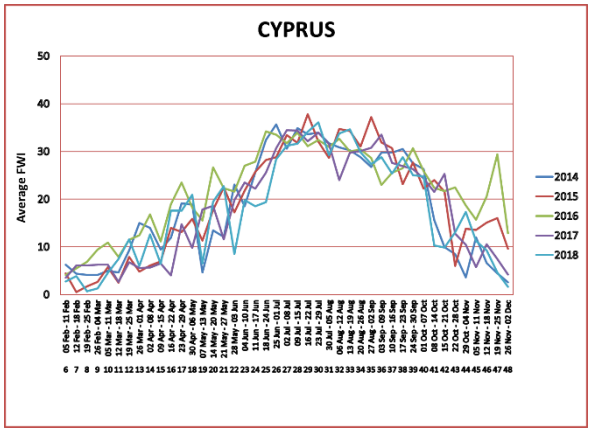
2016
2017
2018


CYPRUS
Average FWI
2014
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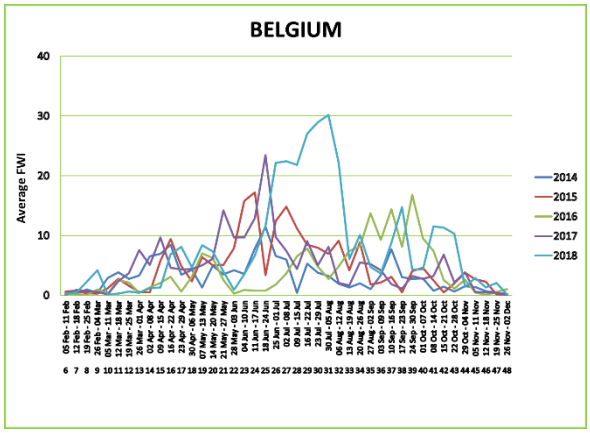
2017
2018


BELGIUM
Average FWI
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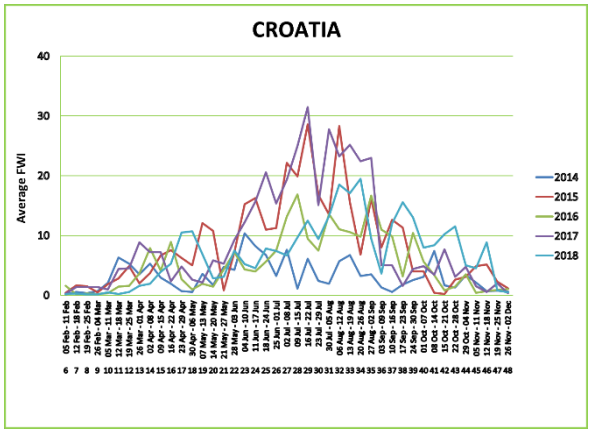
CROATIA
Average FWI
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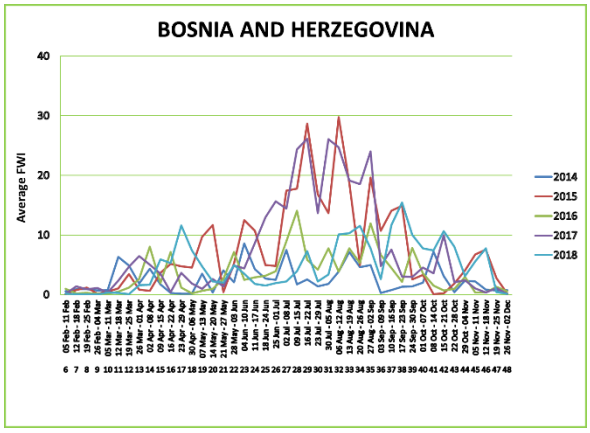
BOSNIA AND HERZEGOVINA
Average FWI
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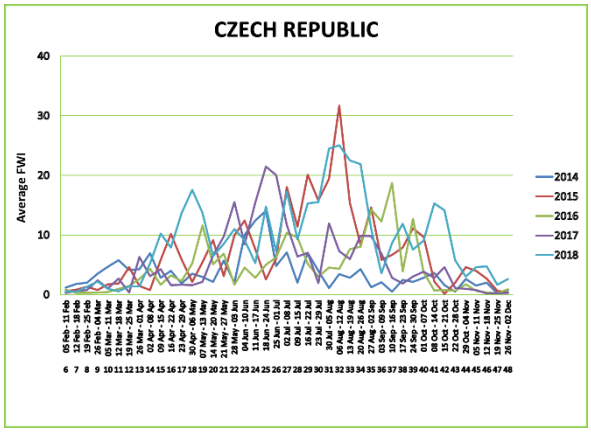
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Average FWI
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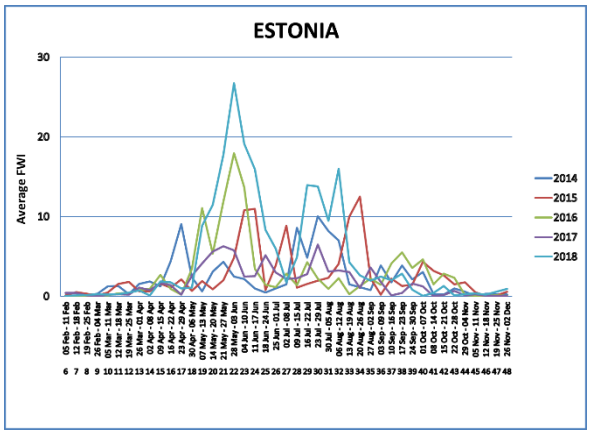
ESTONIA
Average FWI
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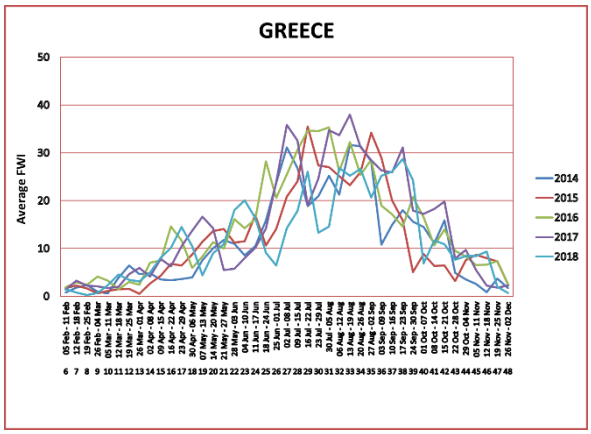
GREECE
Average FWI
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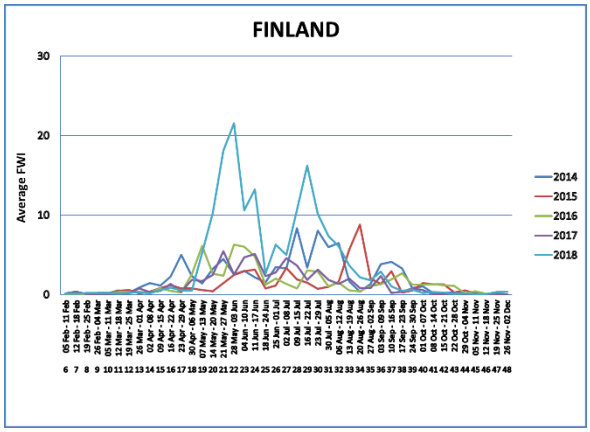
FINLAND
Average FWI
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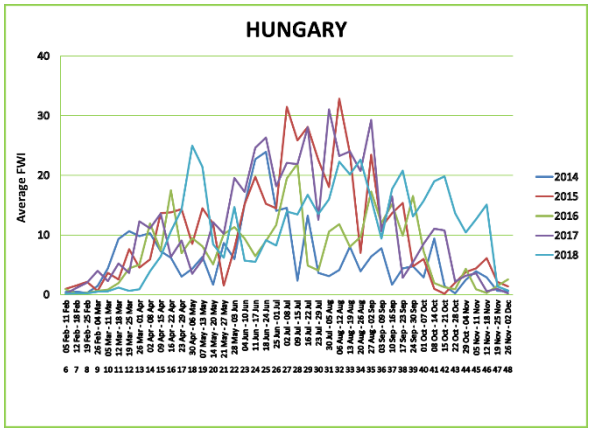
HUNGARY
Average FWI
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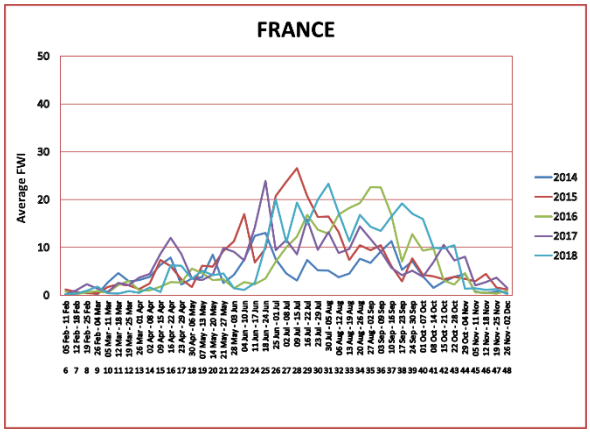
FRANCE
Average FWI
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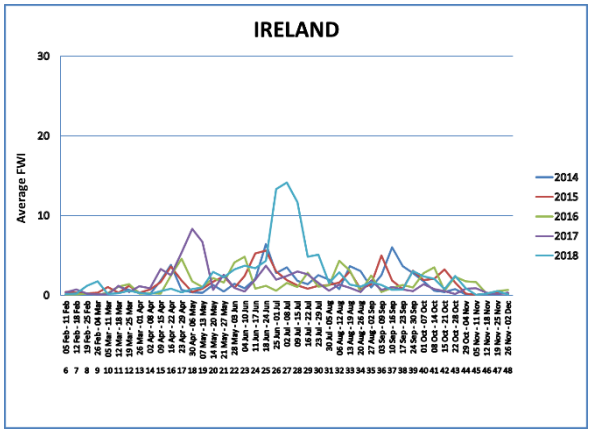
IRELAND
Average FWI
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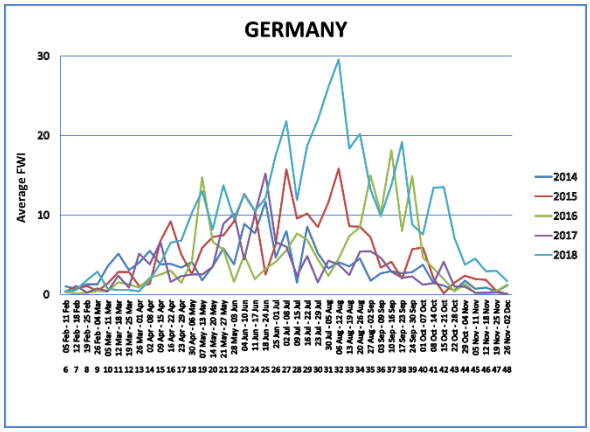
GERMANY
Average FWI
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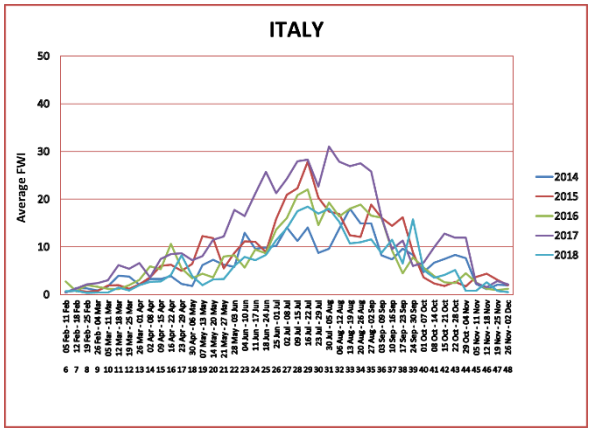
ITALY
Average FWI
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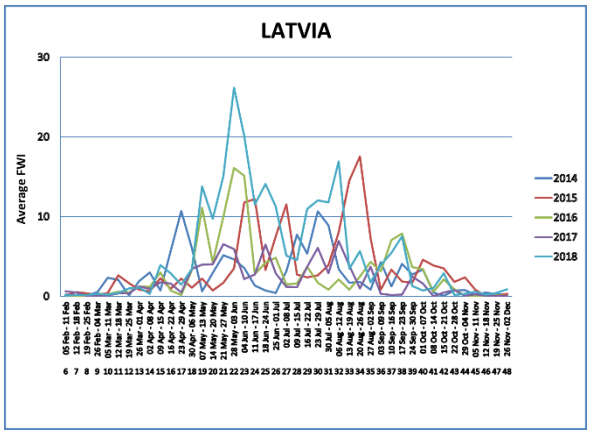
LATVIA
Average FWI
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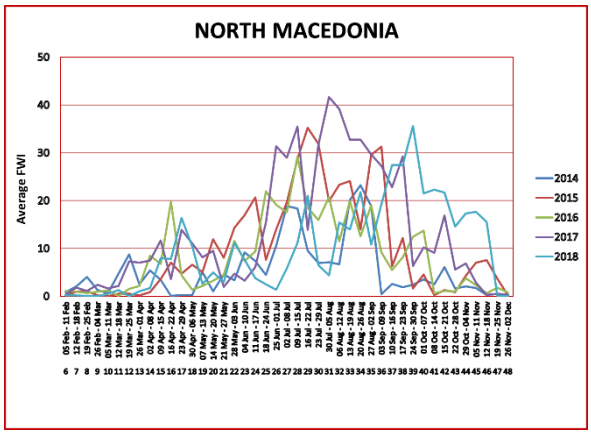
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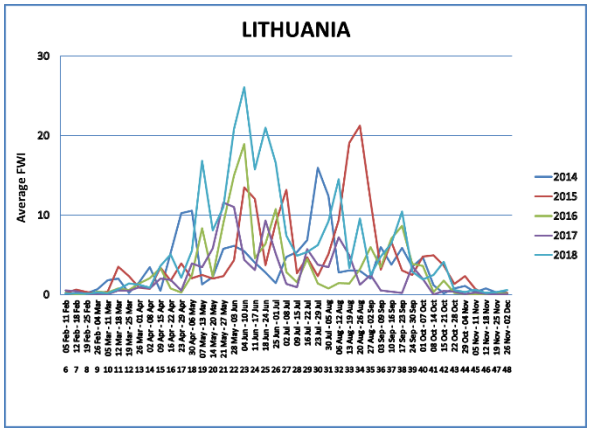
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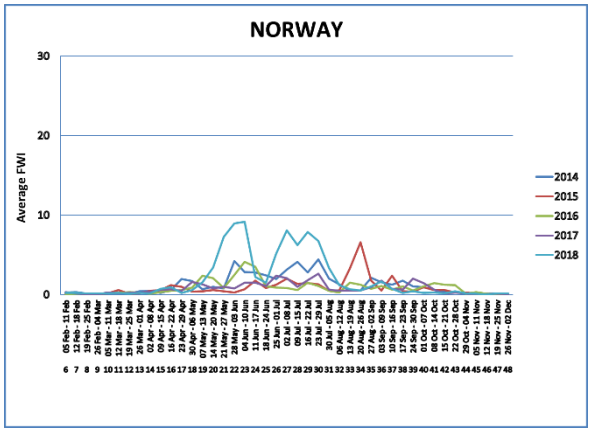
NORWAY
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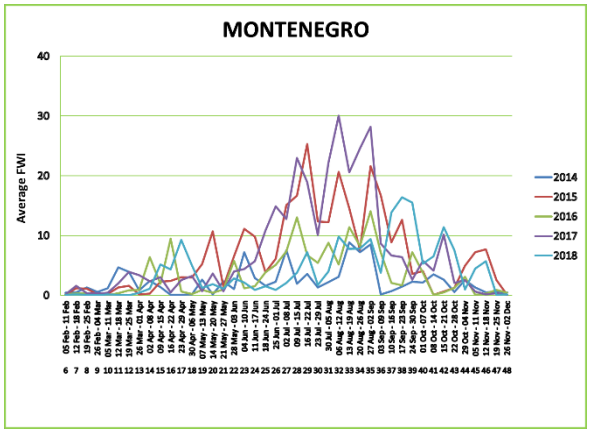
MONTENEGRO
Average FWI
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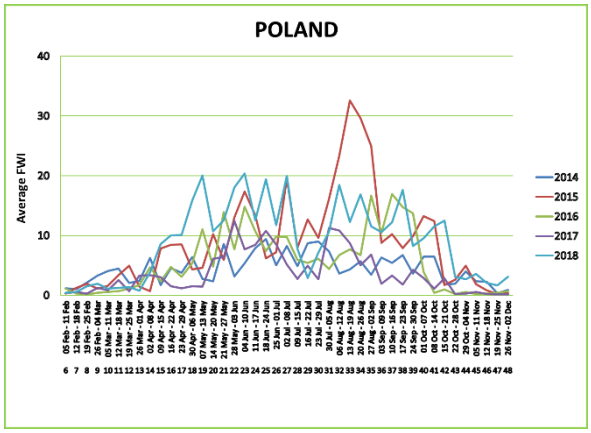
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Average FWI
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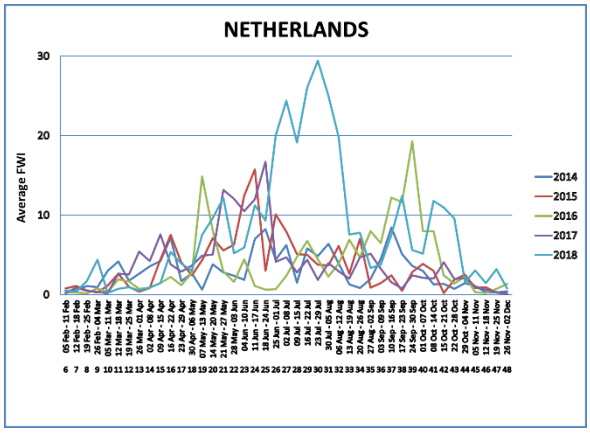
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Average FWI
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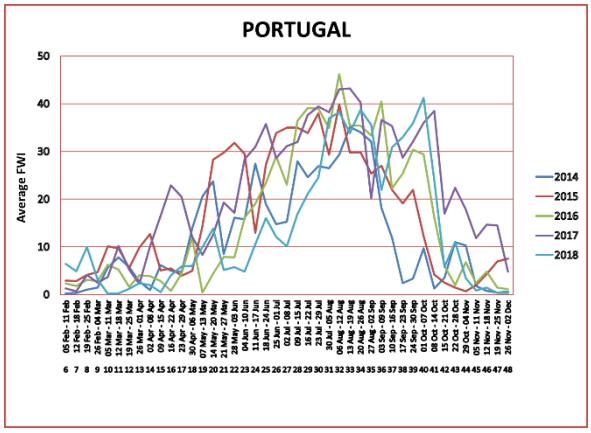
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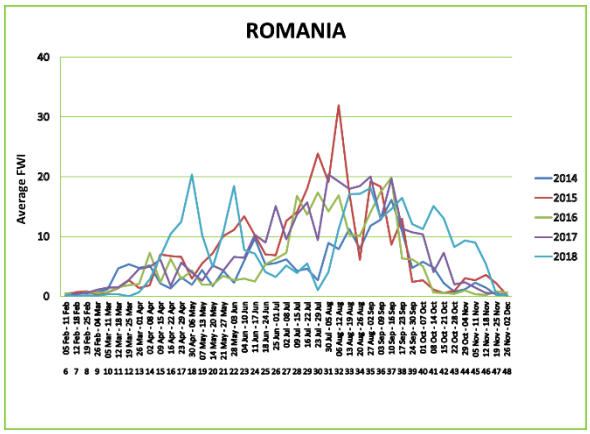
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Average FWI
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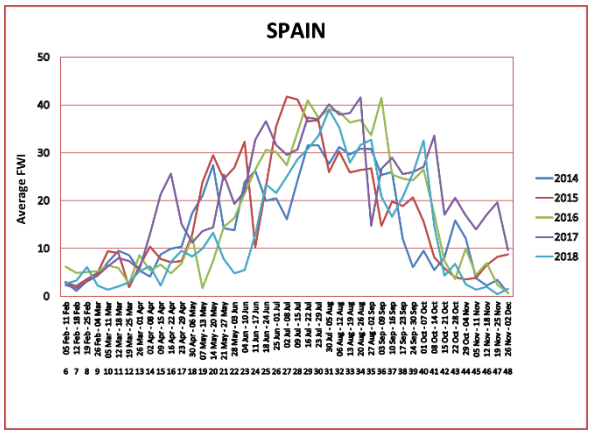
SPAIN
Average FWI
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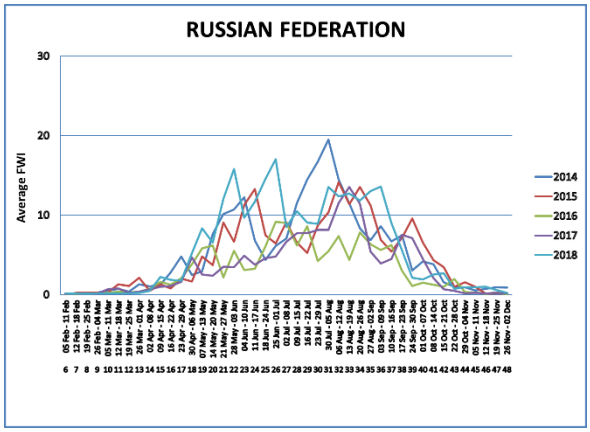
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Average FWI
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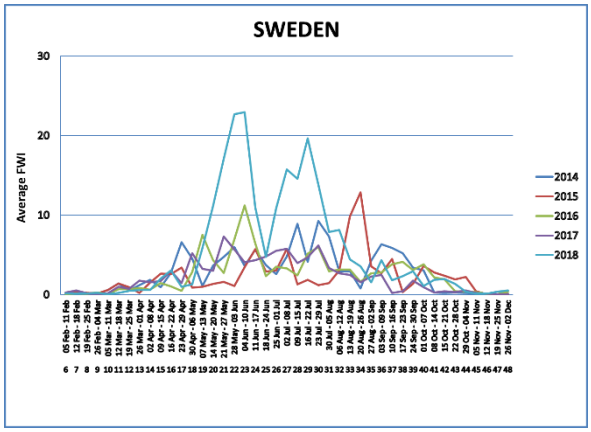
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Average FWI
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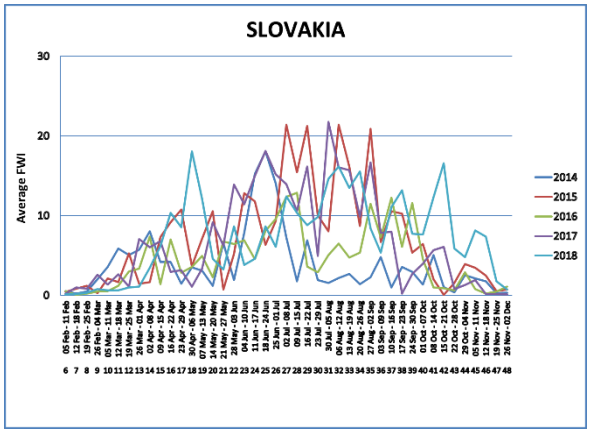
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Average FWI
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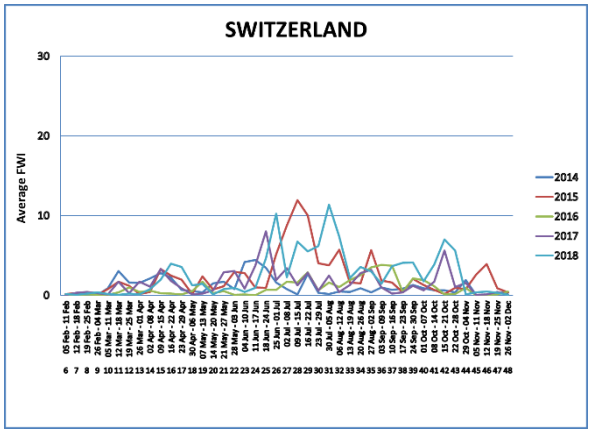
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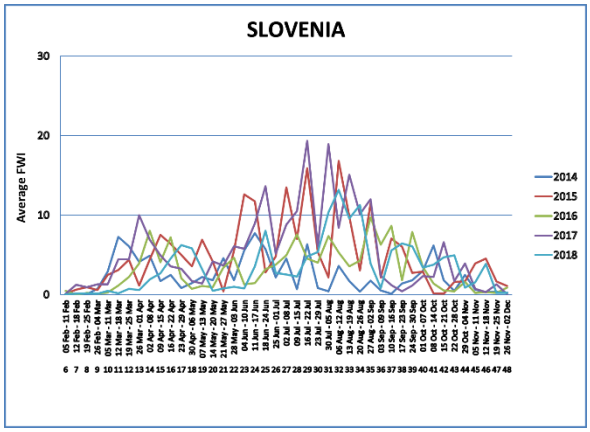
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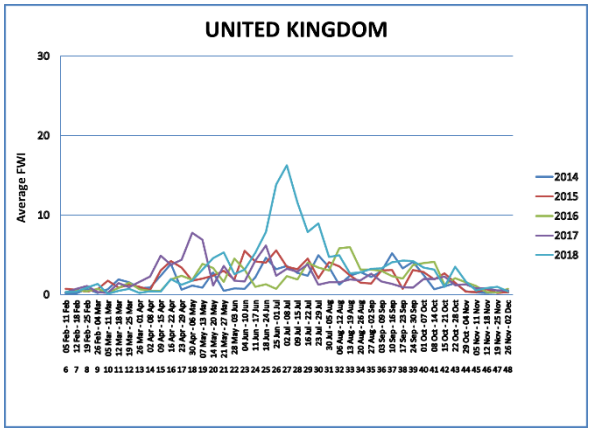
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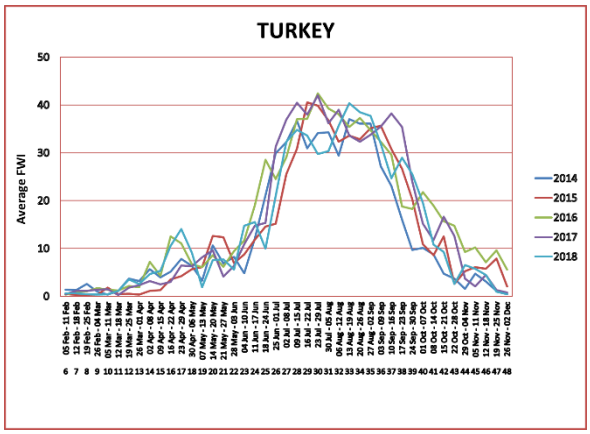
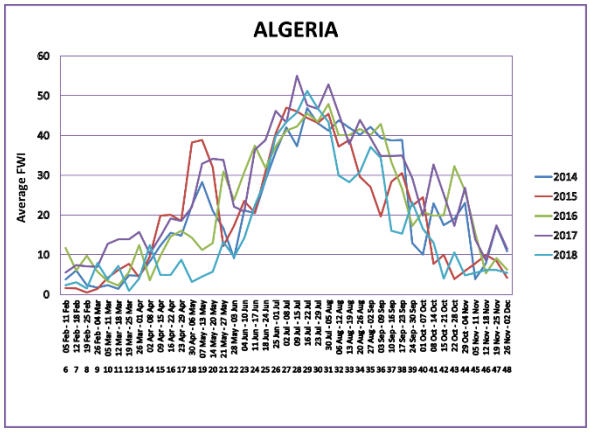
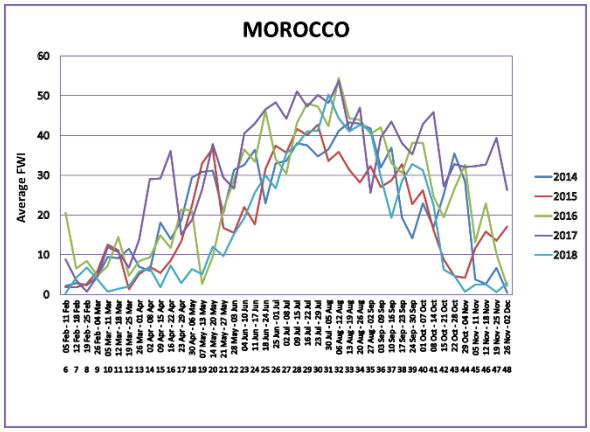
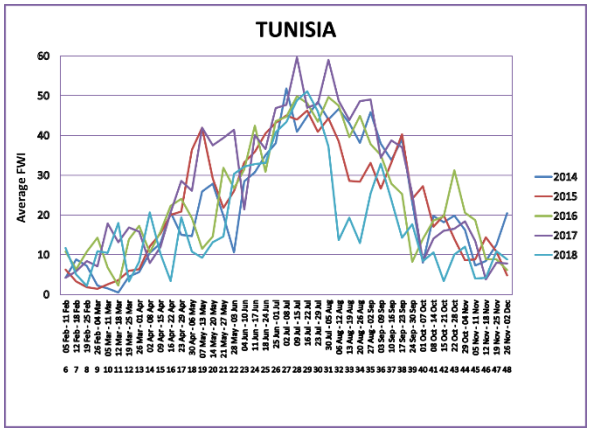


MENA Countries







As mentioned previously, weekly country averages tend to flatten local fire danger peaks, which as a consequence become less evident, especially in those countries such as France or Italy, where there are strong differences in fire danger level with changing latitudes.

Therefore, to show more clearly the seasonal changes in FWI in the larger EU Mediterranean countries, i.e. Portugal, Spain, France, Italy and Greece, their territory has been further divided for fire danger reporting, according to the map shown in Figure 1. The division criteria are mainly administrative and should be taken as provisional, since other fire risk reporting sub-regions, with a specific focus on environmental criteria, might be proposed in the future.

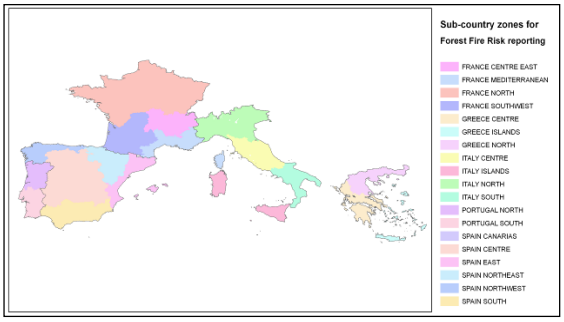


Figure 1. Sub-country regions identified for fire danger trend reporting in the five largest Mediterranean Member States.

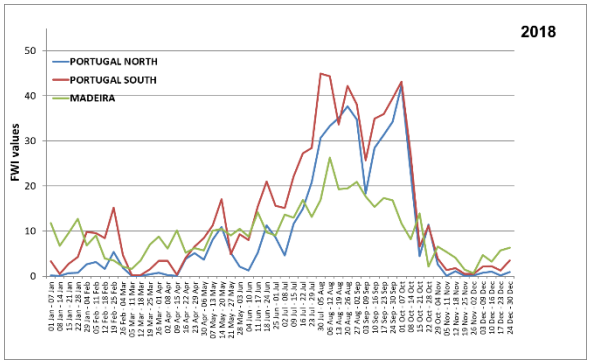


Figure 2. Fire danger trends in 2018 as determined by the Fire Weather Index (FWI) in the regions identified for Portugal.

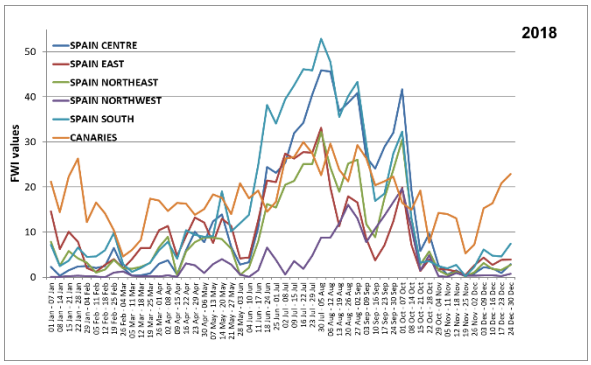


Figure 3. **Fire danger trends in 2018** as determined by the Fire Weather Index (FWI) in the regions identified for Spain.

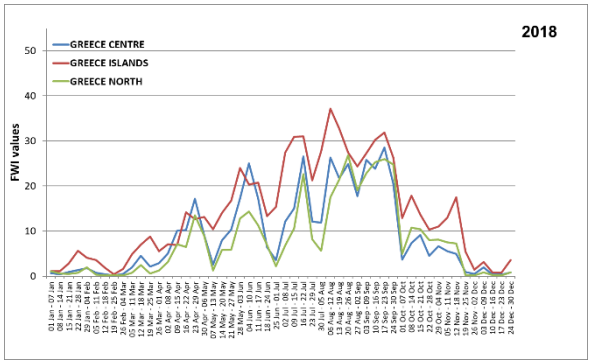


Figure 4. Fire danger trends in 2018 as determined by the Fire Weather Index (FWI) in the regions identified for Greece.

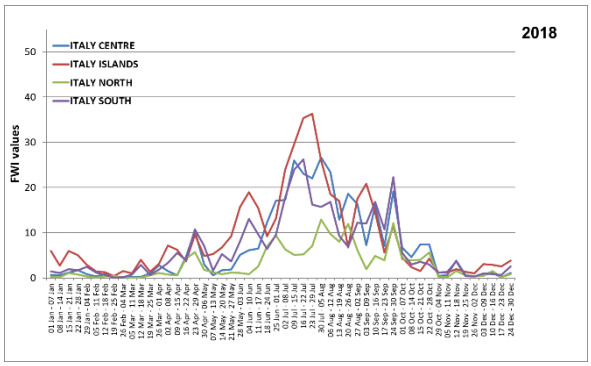


Figure 5. **Fire danger trends in 2018 as determined by the Fire Weather Index (FWI) in the regions identified for Italy.**

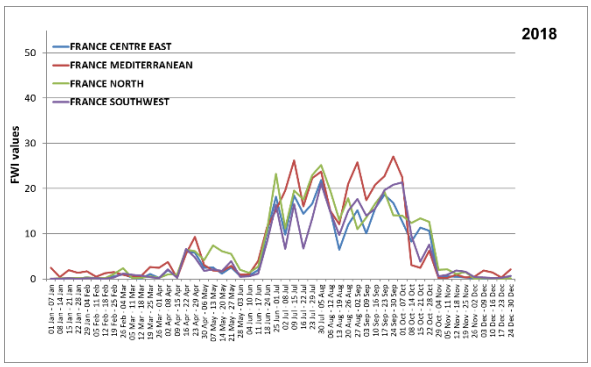
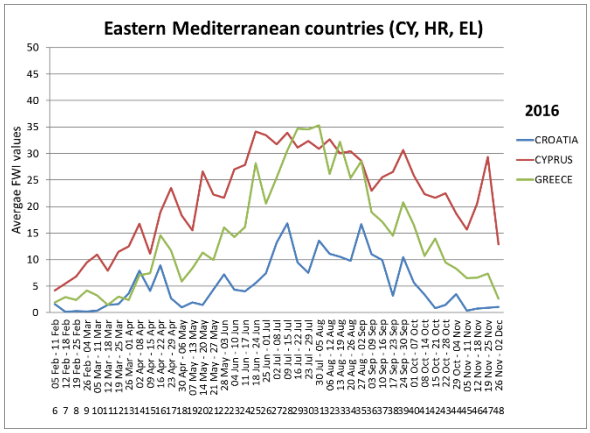
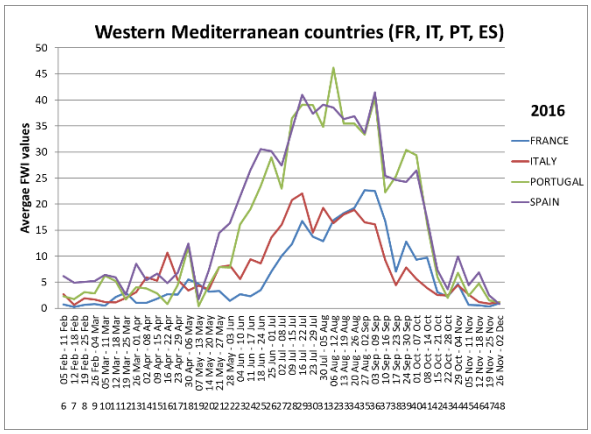
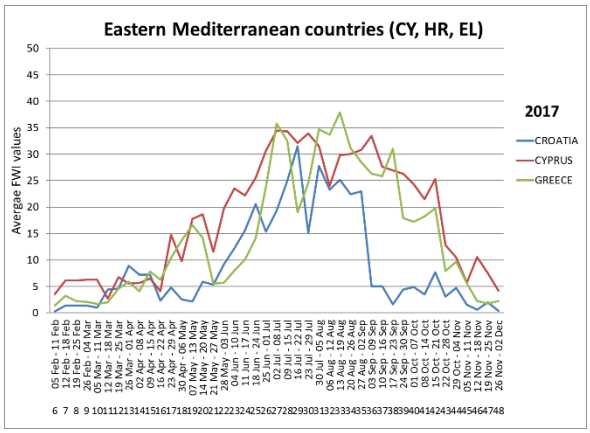


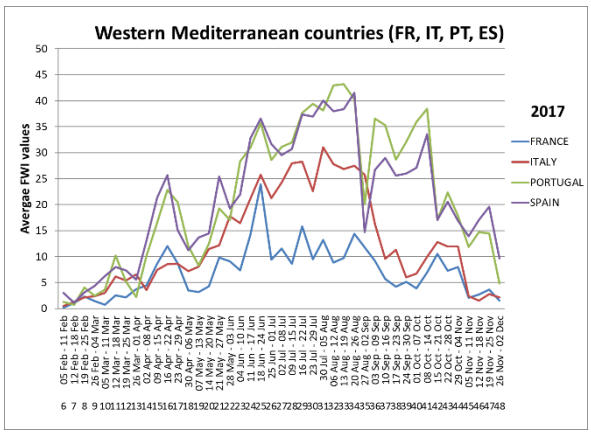
Figure 6. Fire danger trends in 2018 as determined by the Fire Weather Index (FWI) in the regions identified for France.

To facilitate the comparison among the different countries in EU, in the next graphs (Figure 7 to Figure 13), the fire danger trends as determined by FWI are shown for countries grouped by main bioclimatic type (e.g. Mediterranean, temperate or boreal). Data are given for 2016-2018.









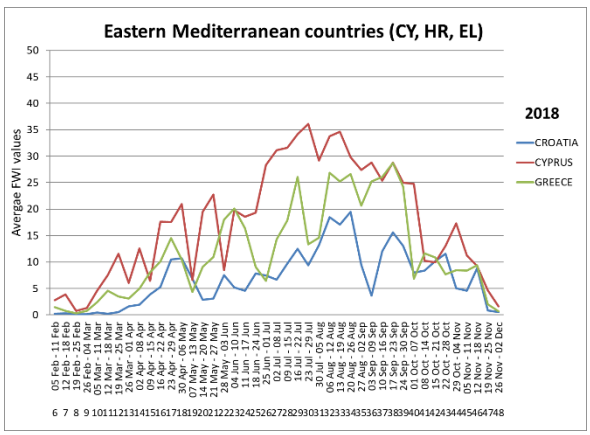


Figure 7. Fire danger trends 2016-2018 in eastern EU Mediterranean countries (CY, HR, EL).

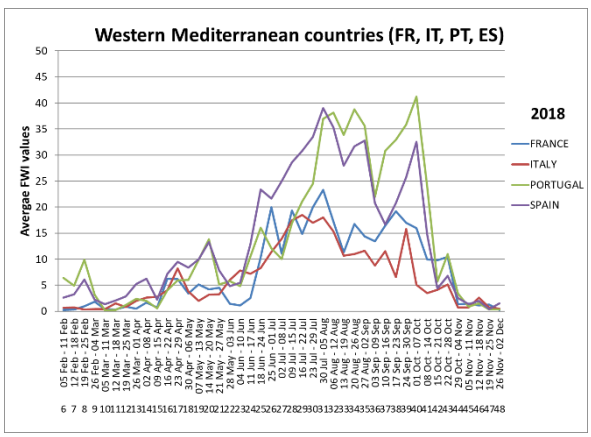
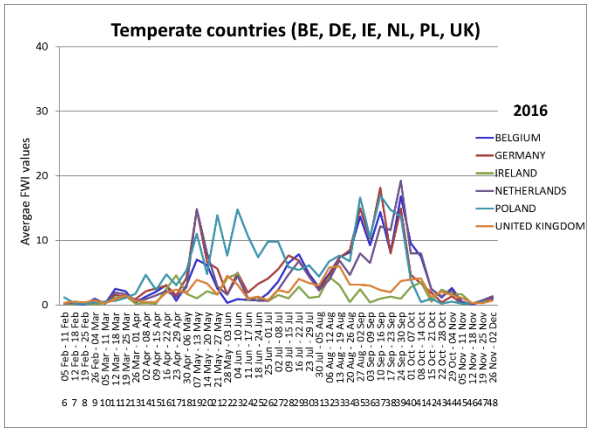
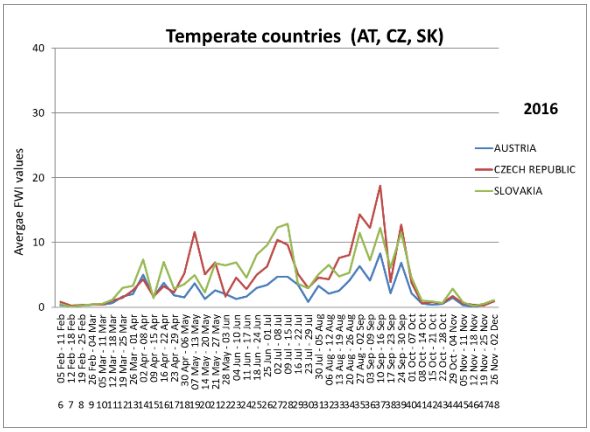
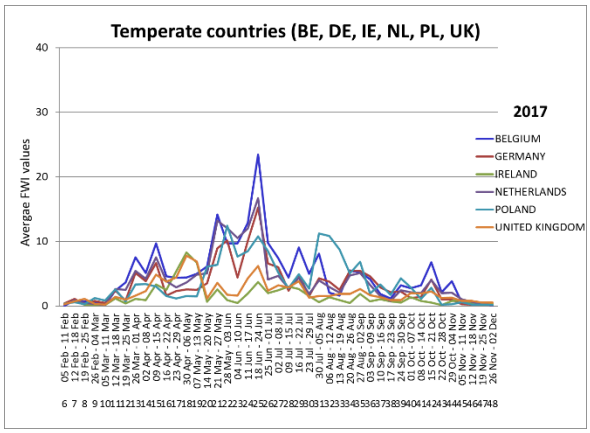
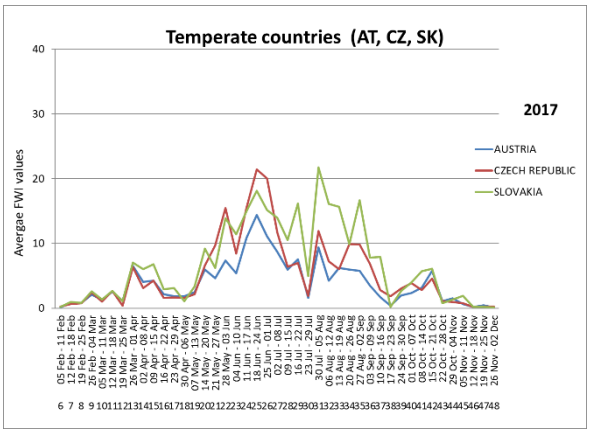


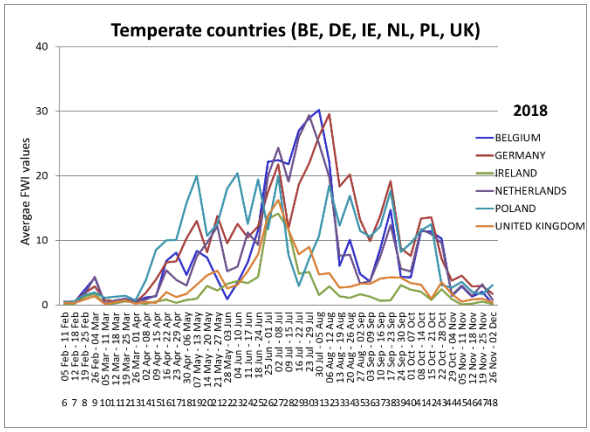
Figure 8. Fire danger trends 2016-2018 in western EU Mediterranean countries (FR, IT, PT, ES).











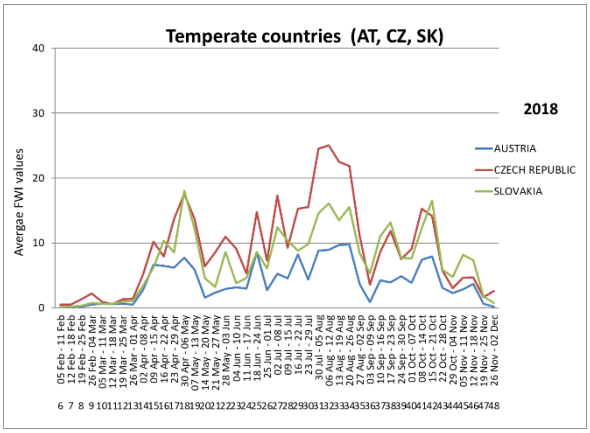
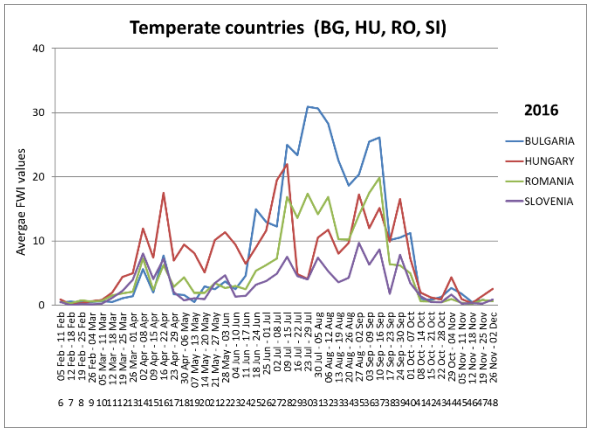
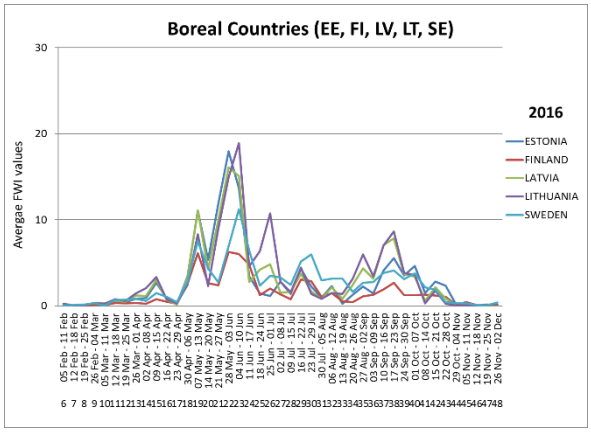
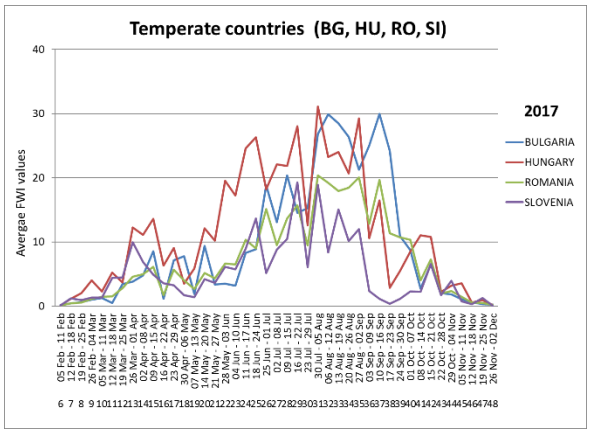


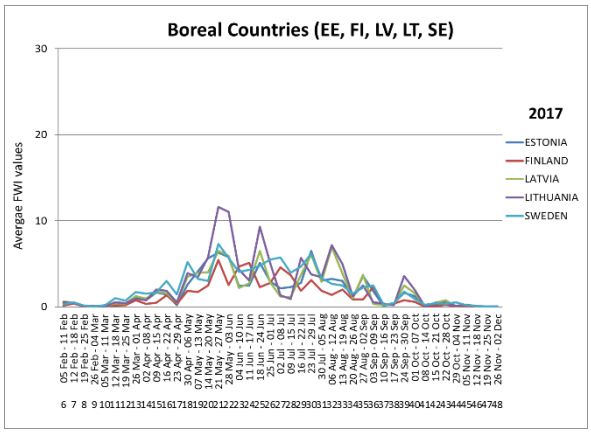
Figure 9. **Fire danger trends 2016-2018 in some northern EU temperate countries (BE, DE, IE, NL, PL, UK).**

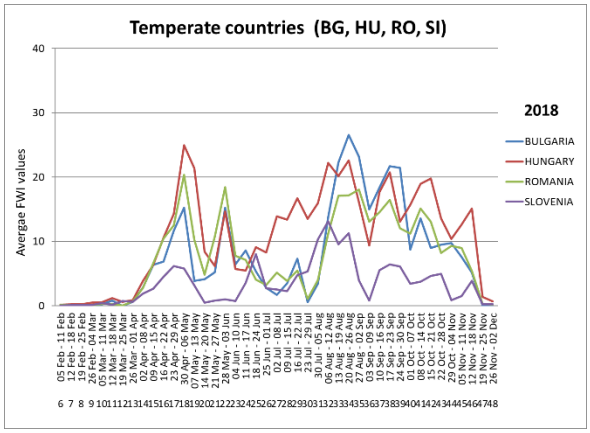
Figure 10. **Fire danger trends 2016-2018 in some central EU temperate countries (AT, CZ, SK).**











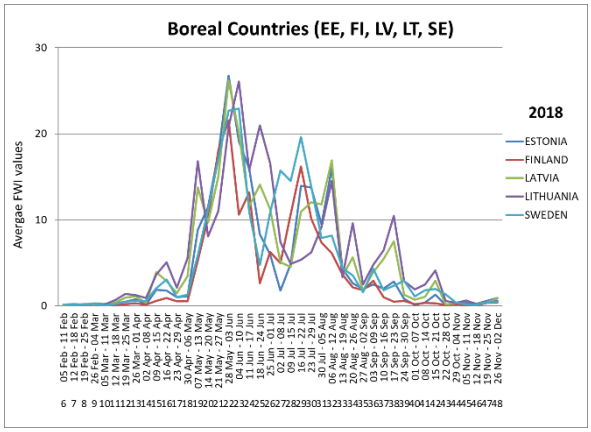
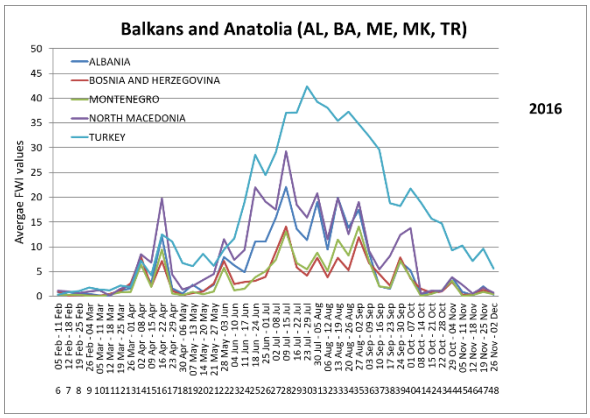
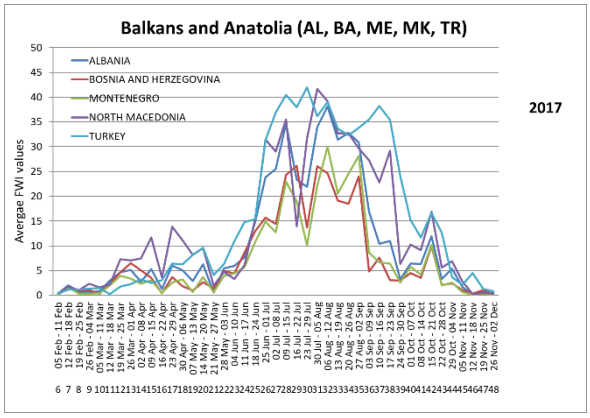


Figure 11. **Fire danger trends 2016-2018 in some eastern EU temperate countries (BG, HU, RO, SI).**

Figure 12. **Fire danger trends 2016-2018 in some EU boreal countries (EE, FI, LV, LT, SE).**





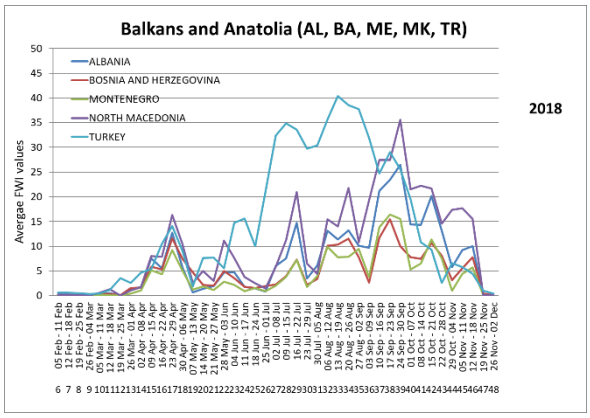
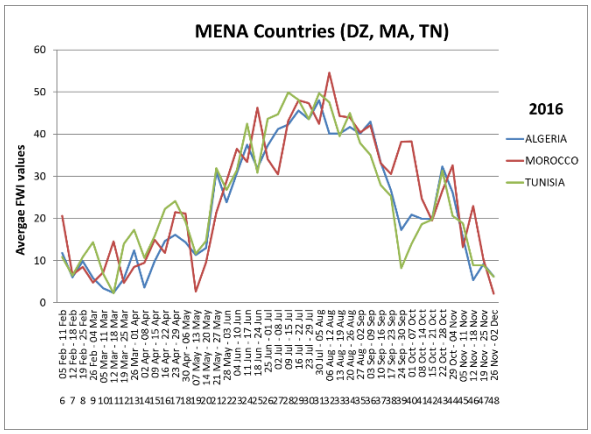
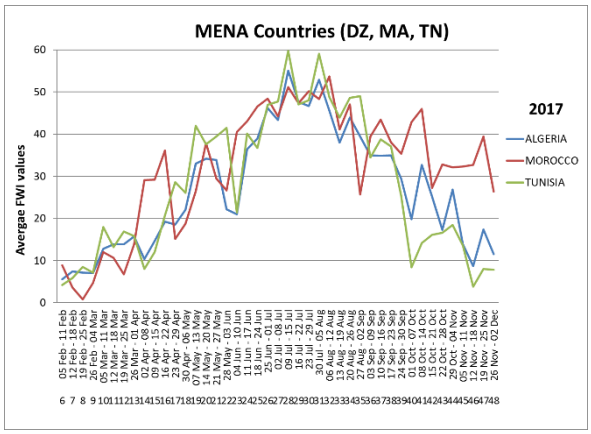


Figure 13. **Fire danger trends 2016-2018) in the Balkans and Anatolia (AL, BA, ME, MK, TR).**





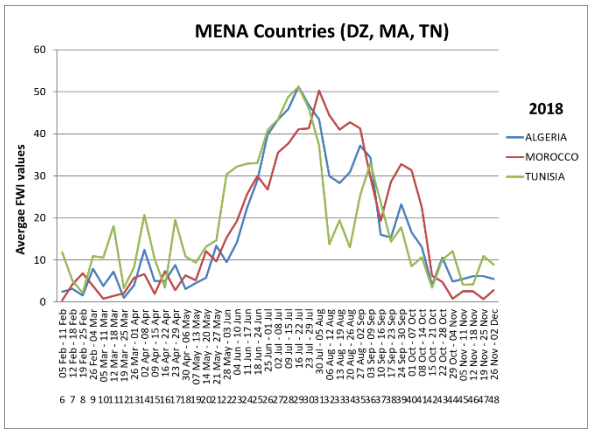


Figure 14. **Fire danger trends 2016-2018 in MENA countries (DZ, MA, TN).**

As in previous years, the Member States gave very positive feedback on the danger assessment activity, urging that the EFFIS Danger Forecast should be continued and improved as part of the European Forest Fire Information System. This dialogue with users and other stakeholders is bound to result in an improved civil protection and forest fire service across Europe, and helps meet the EU's aim of providing environmental information and services that can be combined with other global environmental information products, in support of the Copernicus (formerly Global Monitoring for Environment and Security - GMES) initiative.

1.2 The EFFIS Rapid Damage Assessment: 2018 results

The Rapid Damage Assessment module of EFFIS was set up to provide reliable and harmonized estimates of the areas affected by forest fires during the fire season. The methodology and the spatial resolution of the satellite sensor data used for this purpose allows all fires of about 30 ha or larger to be mapped. In order to obtain the statistics of the burnt area by land cover type the data from the European CORINE Land Cover 2006 (CLC) database were used. Therefore the mapped burned areas were overlaid with the CLC data, making it possible to derive damage assessment results comparable for all the EU countries.

EFFIS Rapid Damage Assessment is based on the analysis of MODIS satellite imagery. The MODIS instrument is on board both the TERRA (morning pass) and AQUA (afternoon pass) satellites. MODIS data has 2 bands with spatial resolution of 250 metres (red and near-infrared bands) and 5 bands with spatial resolution of 500 metres (blue, green, and three short-wave infrared bands). Mapping of burnt areas is based mainly on the 250 metre bands, although the MODIS bands at 500 metres resolution are also used, as they provide complementary information that is used for improved burnt area discrimination. This type of satellite imagery allows detailed mapping of fires of around 30 ha or larger. Although only a fraction of the total number of fires is mapped (fires smaller than 30 ha are not mapped), the analysis of historical fire data has determined that the area burned by wildfires of this size represents in most cases the large majority of the total area burned. On average, the area burned by fires of at least 30 ha accounts for about 75% of the total area burnt every year in the Southern EU.

Since 2008, EFFIS has included Northern African countries in the mapping of burned area, following the agreement with FAO *Silva Mediterranea*, the FAO statutory body that covers the Mediterranean region.

The results for each of the countries affected by forest fires of over 30 ha are given in the following paragraphs in alphabetical order, followed by a section on the MENA countries.

The total area burned in 2018, as shown by the analysis of satellite imagery, is shown in Table 1. These figures may also include agricultural and urban areas that were burned during the forest fires. Figure 15 below shows the scars caused by forest fires during the 2018 season.

In 2018 fires of greater than 30 ha were observed in 39 countries and a total burnt area of 203 295 ha was mapped. This is less than one-sixth the amount burnt in 2017 and lower than the long term average. However, large fires were recorded in more countries than usual, and parts of Northern Europe had a worse than average year. (Figure 21 below).

Table 1. Areas burned by fires of at least 30 ha in 2018 estimated from satellite imagery.

Country	***Area (Ha)***	***Number of Fires***
Albania	3280.27	14
Algeria	1716.09	21
Belgium	165.27	5
Bosnia & Herzegovina	3139.29	12
Bulgaria	2025.09	15
Croatia	1289.06	7
Cyprus	441.31	7
Denmark	463.2	4
Estonia	440.04	9
Finland	411.09	11
France	2422.18	20
Germany	3702.16	36
Greece	12065.71	34
Hungary	95.92	2
Iraq	116.15	1
Ireland	2868.48	29
Israel	105.3	2
Italy	14649.08	147
Kosovo under UNSCR 1244	1393.73	12
Latvia	2546.39	8
Lebanon	74.14	2
Libya	272.48	4
Malta	31.94	1
Montenegro	4404.2	23
Morocco	1132.65	17
Norway	352.52	10
Poland	397.46	5
Portugal	37146.27	83
Romania	3340.96	42
Serbia	5799.87	46
Spain	11639.73	90
Sweden	21604.83	74
Switzerland	26.27	1
Syria	1570.59	22
North Macedonia	2391.15	18
The Netherlands	77.41	2
Tunisia	986.09	6
Turkey	40678.31	271
United Kingdom	18032.26	79
TOTAL	***203294.9***	***1192***

Figure 15. Burnt scars produced by forest fires during the 2018 fire season.

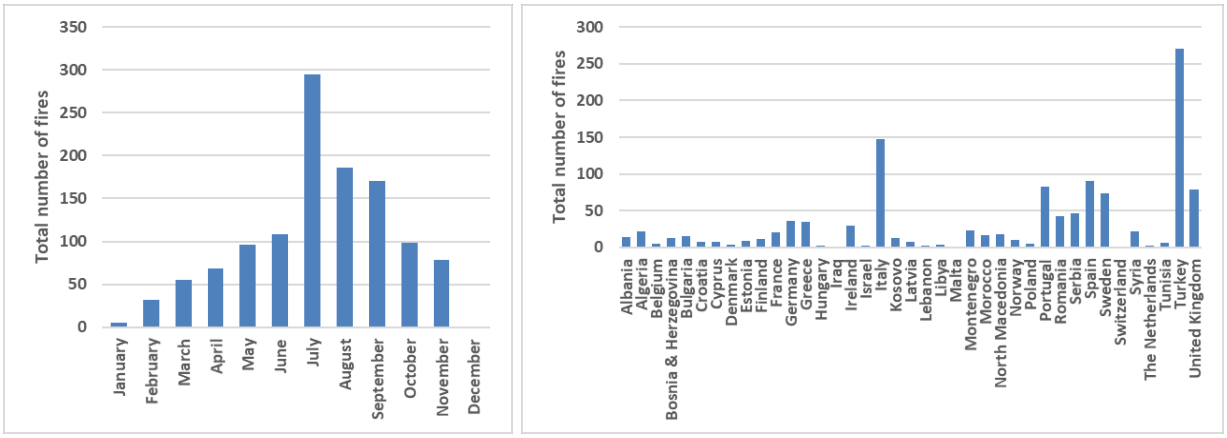


Figure 16. Total number of fires >30 ha by month and country in 2018.

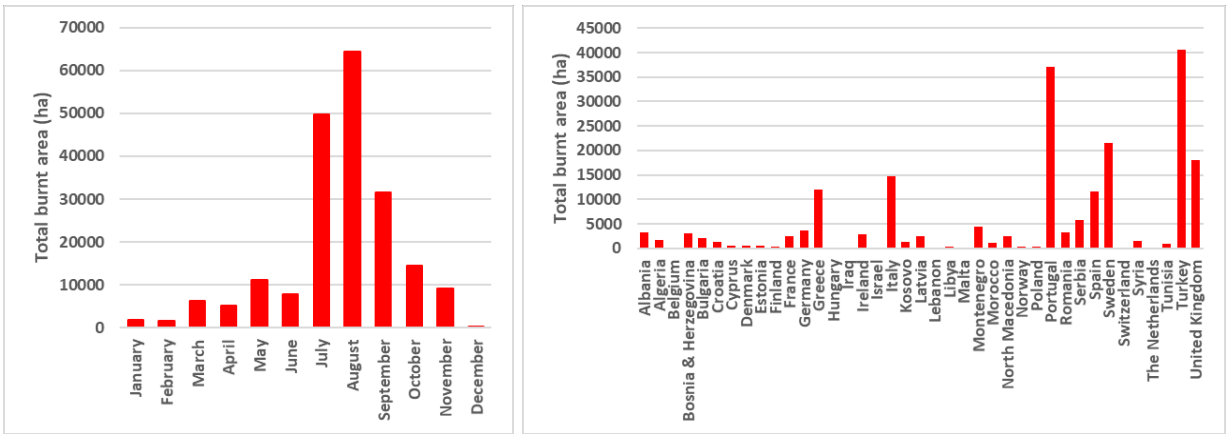


Figure 17. Total burnt area of fires >30 ha by month and country in 2018.

Damage to Natura2000 sites

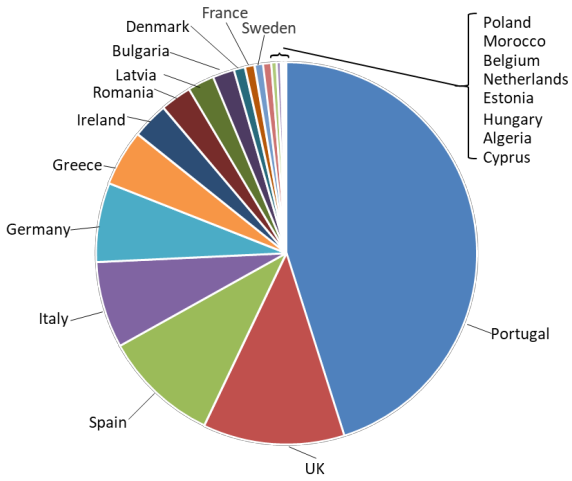
Of particular interest is the analysis of the damage caused by fires to the areas protected within the Natura2000 network, as they include habitats of especial interest which are home for endangered plant and animal species.

The category of Natura2000 areas only exists in the countries of the European Union. Information on other protected areas outside the EU is presented for those countries for which the information is available. The area burnt within the Natura2000 and other protected sites is presented below.

Country	*Area (Ha)*	*% of Natura2000 Area*	*Number of Fires*
Belgium	165.27	165.27	0.043
Bulgaria	2025.09	898.38	0.024
Cyprus	441.31	0.3	0
Denmark	463.2	456.69	0.119
Estonia	440.04	74.4	0.009
France	2422.18	387.53	0.006
Germany	3702.16	3291.95	0.06
Greece	12065.71	2331.38	0.065
Hungary	95.92	58.85	0.003
Ireland	2868.48	1500.8	0.165
Italy	14649.08	3588.64	0.062
Latvia	2546.39	1118.02	0.153
Poland	397.46	339.99	0.006
Portugal	37146.27	22078.89	1.155
Romania	3340.96	1293.18	0.03
Spain	11639.73	4815.09	0.035
Sweden	21604.83	360.74	0.006
Netherlands	77.41	76.48	0.013
UK	18032.26	5869.65	0.333
EU28 total	**48706.23**		**261**
Algeria	26.86	0.016	1
Morocco	216.57	0.028	2
TOTAL	**48949.7**		**264**

The total burnt in protected areas in 2018 was 48 950 ha, less than a quarter that recorded in 2017. Portugal was the most affected country in 2017, accounting for around 45% of the total Natura2000 burnt area, almost all from a single large fire in Monique. UK and Spain account for around 12% and 10% respectively.

Summary	Total Area (Ha)
EU28	**135855.9**
Other European countries	**61465.6**
Middle East and North Africa	**5973.5**
Natura2000 and protected sites	**48949.7**



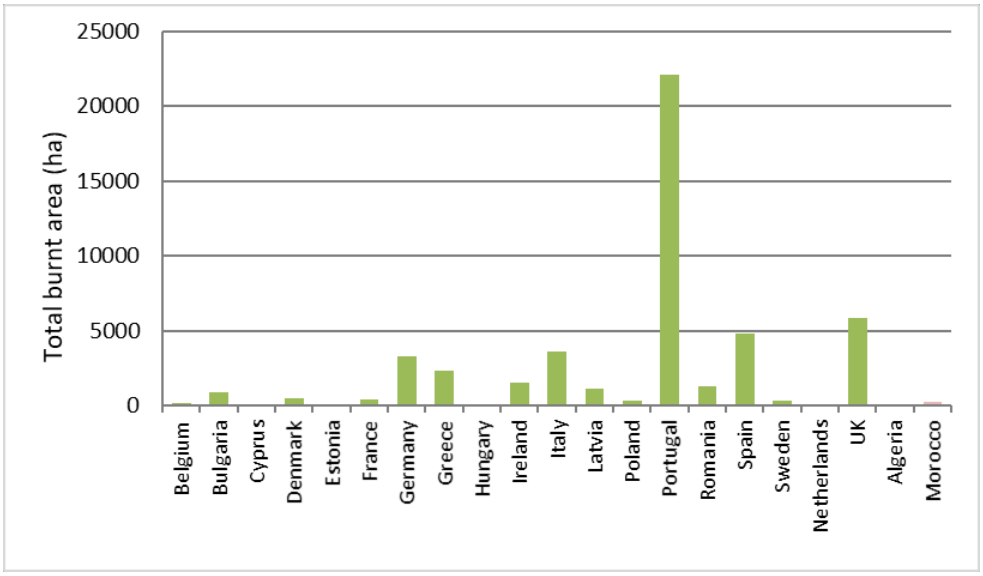


Figure 18. Burnt area in Natura2000 sites and other protected areas in 2018.

Affected land cover types

58% of the burnt area in 2018 was in Forest and Other Wooded Land, as identified by the CORINE Land Cover Type classification system (Figure 19).

This is similar to the proportion burnt last year, although the total amount is significantly lower. The historic average proportion burnt in Forest and Other Wooded Land is around 45%.

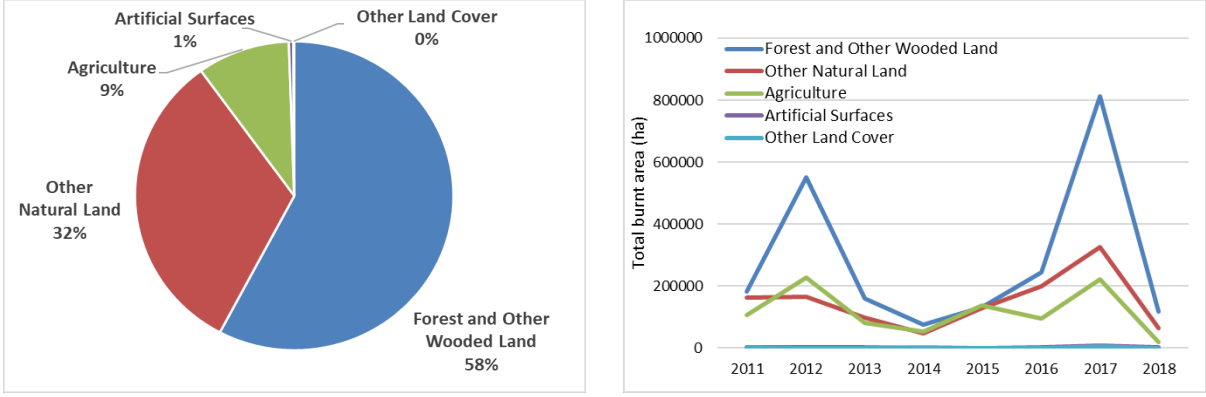


Figure 19. a) Proportions of land cover types affected in 2018 (all countries); b) Total burnt area by land cover type 2011-2018 (all countries).

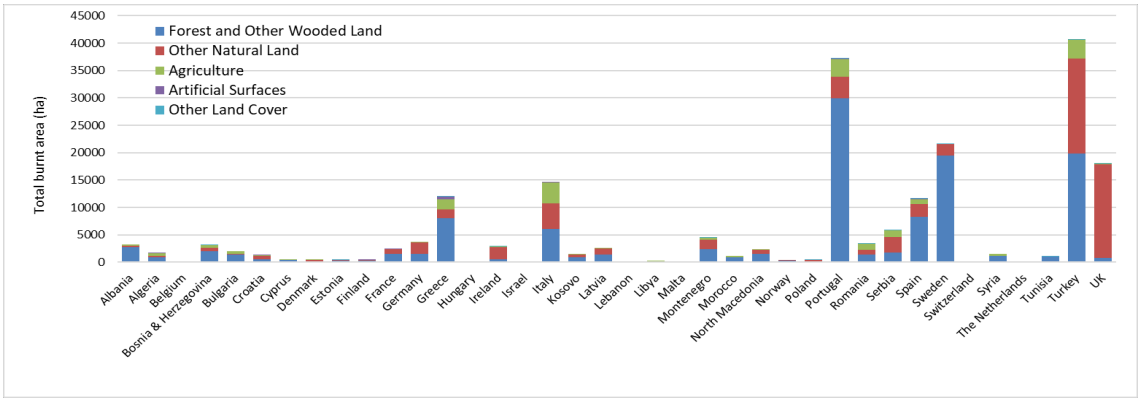


Figure 20. Burnt area in each country in 2018 by CORINE land class

European countries

In 2018, 22 of the EU28 countries were affected by fires of over 30 ha: (Belgium, Bulgaria, Croatia, Cyprus, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Malta, the Netherlands, Poland, Portugal, Romania, Spain, Sweden, United Kingdom), burning 135 856 ha in total (only around 13% of the amount that was recorded in 2017).

Of this total, 48 706 ha (36%) were on Natura2000 sites. Although Portugal was again the country with the highest burnt area, its total was a small fraction of the area lost to fire in 2017 and one of the lowest totals of the last 10 years (only 2014 was lower). Italy recorded more fires than any other EU28 country, as shown by Figure 16 and Figure 17 above.

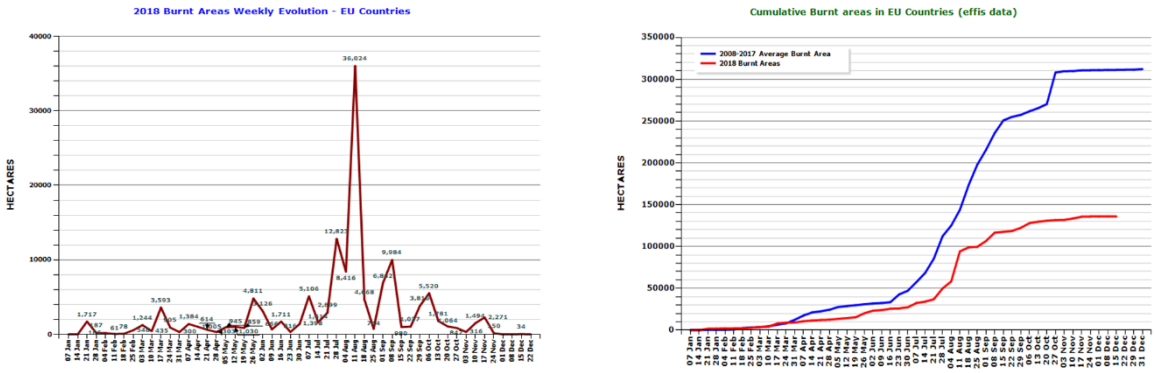


Figure 21. Burnt area weekly evolution and cumulative burnt area in 2018 (European Union countries).

Burnt areas are split into different land cover types using the CLC 2006 database unless otherwise specified.

1.2.1 Albania

The total burnt area of 3 280 ha recorded in Albania was less than 10% of the amount recorded in 2017, and the lowest since 2014. There were 14 fires of over 30 ha in 2018 (compared with 223 in 2017). Most of them occurred in September and October, relatively late in the year. The burnt area scars left by the 2017 fires in Albania can be seen in Figure 22.

Table 2. Distribution of burnt area (ha) in Albania by land cover types in 2018.

Land cover	*Area burned*	*% of total*
Forest/Other Wooded Land	2727.54	83.15
Other Natural Land	294.91	8.99
Agriculture	257.82	7.86
TOTAL	**3280.27**	**100**

1.2.2 Belgium

Large fires are relatively rare in Belgium, but in 2018 there were 5 fires over 30 ha which burnt a total of 165 ha between February and September. The fires occurred in Other Natural Land, all on Natura2000 sites.

1.2.3 Bosnia and Herzegovina

Bosnia-Herzegovina had very few large fires in 2018, and the season's total was the lowest recorded since 2009. Most of the damage occurred in August and September. In total there were only 12 fires over 30 ha mapped in the year. Visible fire scars caused by forest fires in Bosnia-Herzegovina can be seen in Figure 22below.

Table 3. Distribution of burnt area (ha) in Bosnia-Herzegovina by land cover types in 2018.

Land cover	*Area burned*	*% of total*
Forest/Other Wooded Land	1982.47	63.15
Other Natural Land	653.57	20.82
Agriculture	491.75	15.66
Artificial Surfaces	0.19	0.01
Other Land Cover	11.3	0.36
TOTAL	**3139.28**	**100**

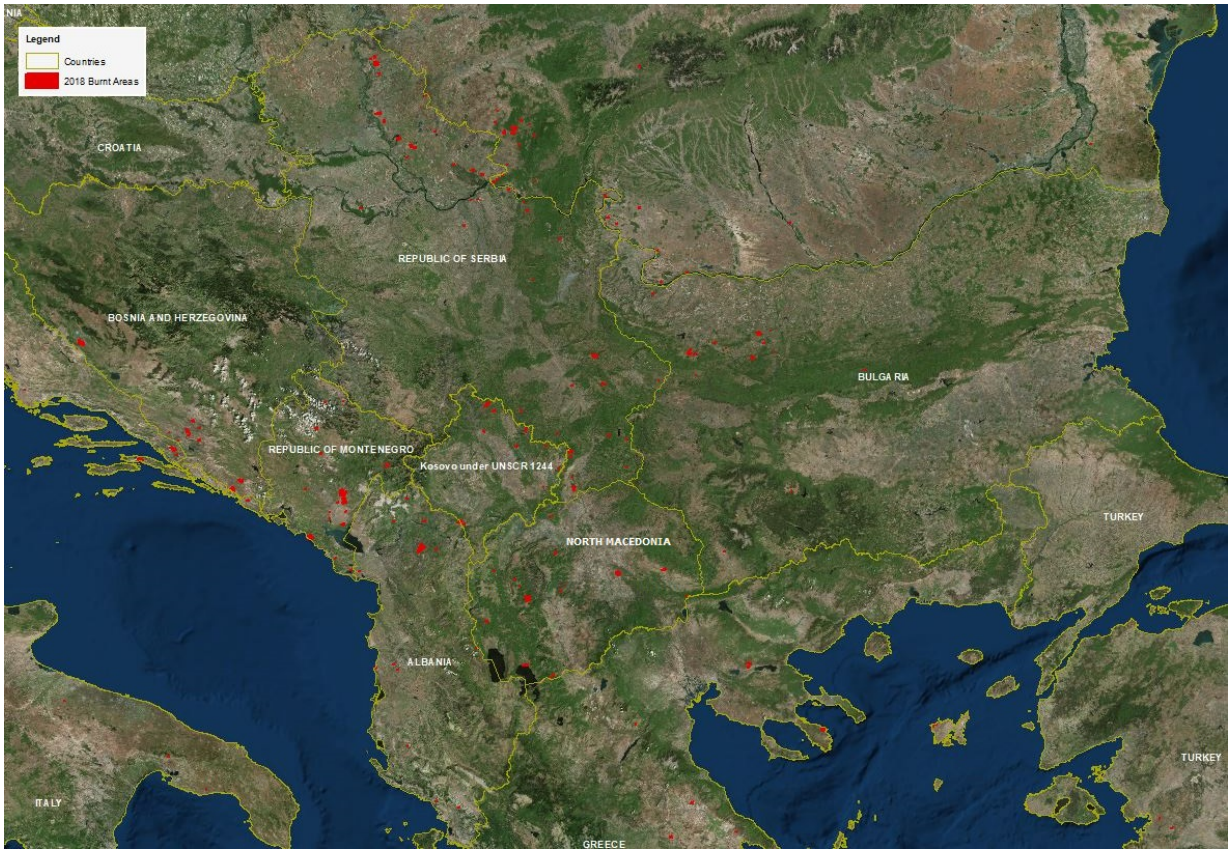


Figure 22. Visible fire scars in Eastern Europe in 2018.

1.2.4 Bulgaria

Bulgaria also had the best year since 2014, with less than half the burnt area recorded compared with 2017. A total of 15 fires of over 30 ha were mapped, the majority in August. Four fires burnt more than 500 ha, with the largest occurring in Blagoevgrad burning 1 646 ha at the end of August. Of the annual total, 4 403 ha occurred on Natura2000 sites, amounting to 84% of the total and 0.117% of Natura2000 land. The scars caused by these fires can be seen in Figure 22 above.

Table 4. Distribution of burnt area (ha) in Bulgaria by land cover types in 2017.

Land cover	*Area burned*	*% of total*
Forest/Other Wooded Land	1567.89	30.08
Other Natural Land	2218.92	42.56
Agriculture	1411.04	27.07
Artificial Surfaces	15.37	0.29
TOTAL	**5213.22**	**100**

1.2.5 Croatia

In common with the rest of the Balkans, Croatia had a light season with only a small fraction of the burnt area compared to 2017. There were 7 fires over 30 ha between July and October burning a total of 1 289 ha. Almost all of the damage occurred in September-October. The scars caused by these fires can be seen in Figure 23. Table 5 presents the distribution of the mapped burnt area by land cover type.

Table 5. Distribution of burnt area (ha) in Croatia by land cover types in 2018.

Land cover	*Area burned*	*% of total*
Forest/Other Wooded Land	585.8	45.44
Other Natural Land	598.59	46.44
Agriculture	104.42	8.1
Artificial Surfaces	0.25	0.02
TOTAL	**1289.06**	**100**

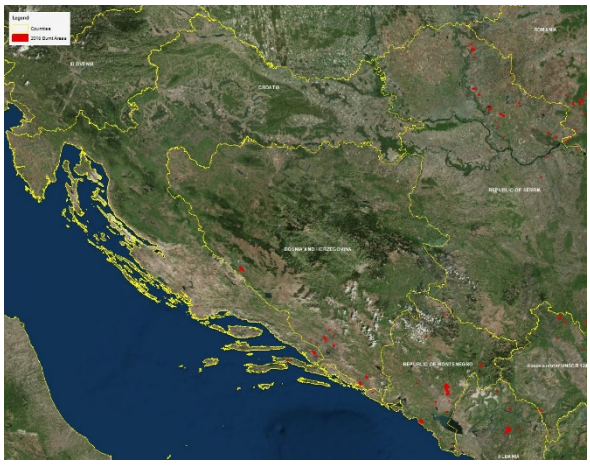


Figure 23. fire scars in Croatia in 2018.

1.2.1 Cyprus

Cyprus had a relatively good year with 7 fires over 30 ha occurring between June and November. Of the 441 ha total, practically none (0.3 ha) occurred on Natura2000 sites. Table 6 presents the distribution of the mapped burned area by land cover type.

Table 6. Distribution of burnt area (ha) in Cyprus by land cover types in 2018.

Land cover	*Area burned*	*% of total*
Forest/Other Wooded Land	396.3	89.8
Other Natural Land	40.32	9.14
Agriculture	4.69	1.06
TOTAL	**441.31**	**100**

1.2.2 Denmark

Denmark had a second year with unusual fire activity after the 2017 season. 4 fires occurred in May and October, burning a total of 463 ha, 98% of it on Natura2000 sites.

Table 7. Distribution of burnt area (ha) in Denmark by land cover types in 2018.

Land cover	*Area burned*	*% of total*
Forest/Other Wooded Land	7.09	1.53
Other Natural Land	438.4	94.65
Agriculture	17.71	3.82
TOTAL	**463.2**	**100**

1.2.3 Estonia

Estonia is not usually affected by large fires, but in 2018 there were 9 fires over 30 ha between May and August, burning 440 ha. 74.4 ha of this occurred on Natura2000 sites, amounting to 17% of the total and 0.009% of the Natura2000 land in Estonia.

Table 8. Distribution of burnt area (ha) in Estonia by land cover types in 2018.

Land cover	*Area*	*% of total*
Forest/Other Wooded Land	279.77	63.58
Other Natural Land	156.35	35.53
Agricultural Areas	2.4	0.54
Other Land Cover	1.51	0.34
TOTAL	**440.04**	**100**

1.2.4 Finland

Like Denmark, Finland also experienced a second year of unusual fire activity, with 11 fires burning a total of 411 ha between May and July. No Natura2000 land was affected.

Table 9. Distribution of burnt area (ha) in Finland by land cover types in 2018.

Land cover	*Area burned*	*% of total*
Forest/Other Wooded Land	301.33	73.3
Other Natural Land	47.16	11.47
Agriculture	62.36	15.17
Artificial surfaces	0.25	0.06
TOTAL	**411.09**	**100**

1.2.5 France

After two severe fire seasons, France had a light year, similar to 2015. There were fires of over 30 ha mapped in from January to November, but unusually, two-thirds of the total burnt area occurred early in January. This included the largest fire of the year which burnt 1 266 ha in Corsica, and which accounted for half the annual total of the country. In total there were 20 fires of over 30 ha, affecting 2 422 ha. Of this, 388 ha were on Natura2000 sites, corresponding to 16% of the total area burned, and 0.006% of the total Natura2000 areas in the country.

Table 10 presents the distribution of the mapped burnt area by land cover type. The burnt scars left by the fires occurring in the southern region of the country and in northern Corsica are shown in Figure 24.

Table 10. Distribution of burnt area (ha) in southern France and Corsica by land cover types in 2018.

Land cover	*Area*	*% of total*
Forest/Other Wooded Land	1483.86	61.26
Other Natural Land	875.39	36.14
Agriculture	62.05	2.56
Artificial Surfaces	0.88	0.04
TOTAL	**2422.18**	**100**

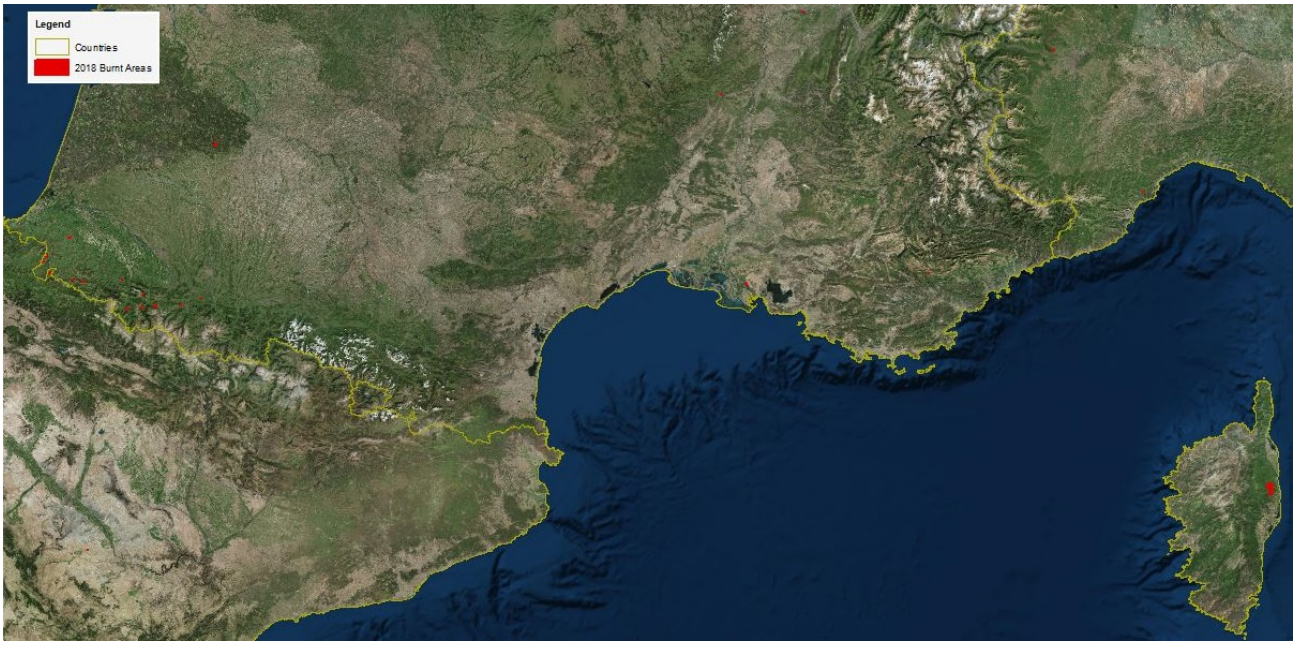


Figure 24. Visible burnt area scars in the South of France and Corsica in 2017.

1.2.6 Germany

Germany's fire season was the worst for years, with 36 fires over 30 ha burning 3702 ha, significantly more than the previous 5 years combined. Fires occurred every month between February and September, although the worst of the season was in the later part of the year. The biggest fire of the year burned over 1000 ha in Emsland in September. Of the annual total, 3 292 ha occurred in Natura2000 sites, amounting to 89% of the total and 0.06% of the Natura2000 area in the country.

Table 11. Distribution of burnt area (ha) in Germany by land cover types in 2018.

Land cover	*Area*	*% of total*
Forest/Other Wooded Land	1456.01	39.33
Other Natural Land	2189.38	59.14
Agriculture	56.77	1.53
TOTAL	**3702.16**	**100**

Figure 25. Fire scars in Germany in 2018.

1.2.7 Greece

Although Greece had a relatively light year for burnt area in 2018, with around two-thirds of the previous year's total affected, it also experienced one of the most deadly fires worldwide in terms of human casualties.

In July two fires started on the same day in Attiki province. The larger one in Kineta covered more than 5 000 ha, but it was the second slightly smaller one (over 1 000 ha) in Mati that resulted in the eventual deaths of 100 people.

In total 12 066 ha from 34 fires was mapped of which 2 331 ha occurred on Natura2000 sites, amounting to 19% of the total and 0.065% of the total Natura2000 area of Greece.

Fires occurred from January to November, but nearly 60% of the damage occurred in July, including the two in Attiki province. There were four other fires over 500 ha. Table 12 presents the distribution of the mapped burnt area by land cover type. Figure 26 shows the burnt area scars in Greece, including the two large fires in Attiki.

Table 12. Distribution of burnt area (ha) in Greece by land cover types in 2018.

Land cover	*Area*	*% of total*
Forest/Other Wooded Land	8030.91	66.56
Other Natural Land	1611.8	13.36
Agriculture	1878.04	15.57
Artificial Surfaces	488.69	4.05
Other Land Cover	56.26	0.47
TOTAL	**12065.71**	**100**

Figure 26. Burnt area scars in Greece in 2018.

1.2.8 Hungary

In Hungary only two fires of over 30 ha were mapped. Both occurred late in the season (September and October) and the second one (59 ha) occurred on a Natura2000 site, representing 61% of the burnt total and 0.003% of the Natura2000 area in the country.

Table 13. Distribution of burnt area (ha) in Hungary by land cover types in 2018.

Land cover	*Area*	*% of total*
Forest/Other Wooded Land	3.41	3.56
Other Natural Land	58.85	61.36
Agriculture	33.65	35.08
TOTAL	**95.92**	**100**

1.2.9 Ireland

Ireland continued a pattern of alternating good/bad years with less than 50% of the damage that was recorded in 2017. There were 29 fires of over 30 ha which burnt a total of 2 868 ha. The fire season lasted most of the year, with fires recorded from February to November. 52% of the burnt area (1 501 ha) was recorded in Natura2000 sites, corresponding to 0.165% of the total Natura2000 land in the country. The most affected land type was Other Natural Land, as shown in Table 14.

Table 14. Distribution of burnt area (ha) in Ireland by land cover types in 2018.

Land cover	*Area*	*% of total*
Forest/Other Wooded Land	567.79	19.79
Other Natural Land	2197.45	76.61
Agriculture	82.31	2.87
Other Land Cover	20.92	0.73
TOTAL	**2868.48**	**100**

1.2.10 Italy

After the disastrous year in Italy in 2017, the fire season of 2018 was a quiet one, with 14 649 ha constituting only around 10% of the burnt area compared with last year. The number of fires over 30 ha, while the second highest recorded (only Turkey had more) was also less than one fifth of those registered in 2017. There were 147 fires between April and November, with 60% of the damage occurring in July. Notable large fires occurred in Palermo and Pisa regions, both over 1 000 ha, and there were also two other fires over 500 ha (compared with 41 fires over 500 ha in 2017).Of the year's total, 3589 ha occurred on Natura2000 sites, corresponding to 24% of the total and 0.062% of the Natura2000 land in Italy. Table 15 presents the distribution of the mapped burnt area by land cover type.

Figure 27. Burnt area scars in central and southern Italy.

Figure 28. Burnt area scars in Pisa region in Italy.

Table 15. Distribution of burnt area (ha) in Italy by land cover types in 2018.

Land cover	*Area*	*% of total*
Forest/Other Wooded Land	6057.83	41.35
Other Natural Land	4697.26	32.07
Agriculture	3800.49	25.94
Artificial Surfaces	93.48	0.64
TOTAL	**14649.06**	**100**

1.2.11 Kosovo under UNSCR 1244

In Kosovo, 12 fires of over 30 ha burned a total of 1394 ha, around one third of the 2017 total. The fires occurred late in the season, between September and November. Table 16 shows the classification of the burnt area by land type.

Table 16. Distribution of burnt area (ha) in Kosovo by land cover types in 2017.

Land cover	*Area*	*% of total*
Forest/Other Wooded Land	914.46	65.61
Other Natural Land	433.3	31.09
Agriculture	45.96	3.3
TOTAL	**1393.72**	**100**

1.2.12 Latvia

Latvia's fire season was the worst for several years, in common with many other northern countries. 8 fires over 30 ha burned a total of 2 546 ha between April and August, including one of 1 483 ha that occurred in Kurzeme region in July and another over 500 ha in Pieriga region in June. 1118 ha of the damage occurred in Natura2000 sites, corresponding to 44% of the total and 0.153% of the total Natura2000 area of the country. Table 15 Table 17 presents the distribution of the mapped burnt area by land cover type.

Table 17. Distribution of burnt area (ha) in Latvia by land cover types in 2018.

Land cover	*Area*	*% of total*
Forest/Other Wooded Land	6057.83	41.35
Other Natural Land	4697.26	32.07
Agriculture	3800.49	25.94
Artificial Surfaces	93.48	0.64
TOTAL	**14649.06**	**100**

1.2.13 Malta

In Malta a fire of 32 ha burned mixed land. No Natura2000 area was affected.

Table 18. Distribution of burnt area (ha) in Malta by land cover types in 2018.

Land cover	*Area*	*% of total*
Forest/Other Wooded Land	5.54	17.35
Agriculture	24.42	76.48
Artificial Surfaces	1.97	6.18
TOTAL	**31.94**	**100.01**

1.2.14 Montenegro

23 fires over 30 ha were mapped in Montenegro, burning 4 404 hectares, less than 10% of the amount of damage recorded in 2017. Fires were recorded through the year from March to November, although almost all of the damage occurred in August and September. Table 19 shows the classification of the burnt area by land type.

Table 19. Distribution of burnt area (ha) in Montenegro by land cover types in 2018.

Land cover	*Area*	*% of total*
Forest/Other Wooded Land	2338.99	53.11
Other Natural Land	1762.35	40.02
Agriculture	302.82	6.88
Other Land Cover	0.04	0
TOTAL	**4404.2**	**100**

1.2.15 The Netherlands

In the Netherlands two fires in March burned a total of 77 ha. Practically all of this (99%) occurred in Natura2000 sites, corresponding to 0.013% of the Natura2000 area of the country.

Table 20. Distribution of burnt area (ha) in the Netherlands by land cover types in 2018.

Land cover	*Area*	*% of total*
Forest/Other Wooded Land	12.77	16.5
Other Natural Land	64.51	83.33
Agriculture	0.13	0.17
TOTAL	**77.41**	**100**

1.2.16 North Macedonia

After 2017, the worst year since 2012, North Macedonia had the best year for 8 years, with only 18 large fires burning a total of 2 391 ha. The first fires were recorded in April, but three-quarters of the damage was in October and November. Visible scars from these fires can be seen in Figure 22 above.

Table 21. Distribution of burnt area (ha) in North Macedonia by land cover types in 2018.

Land cover	*Area*	*% of total*
Forest/Other Wooded Land	1558.19	65.16
Other Natural Land	688.33	28.79
Agricultural Areas	144.62	6.05
TOTAL	**2391.14**	**100**

1.2.17 Norway

In Norway there were 10 fires over 30 ha that burned a total of 353 ha, slightly more than was recorded in 2017. All but one of the fires occurred in July.

Table 22. Distribution of burnt area (ha) in Norway by land cover types in 2018.

Land cover	*Area*	*% of total*
Forest/Other Wooded Land	272.81	77.39
Other Natural Land	79.71	22.61
TOTAL	**352.52**	**100**

1.2.18 Poland

There were 5 fires over 30 ha in Poland burning a total of 397 ha. The biggest one was in September and affected 272 ha. Of the total, 340 ha (85%) occurred on Natura2000 sites, corresponding to 0.006% of the Natura2000 area of the country.

Table 23. Distribution of burnt area (ha) in Poland by land cover types in 2018.

Land cover	*Area*	*% of total*
Forest/Other Wooded Land	76.37	19.21
Other Natural Land	320.25	80.57
Artificial surfaces	0.81	0.2
Other Land Cover	0.04	0.01
TOTAL	**397.46**	**100**

1.2.19 Portugal

Portugal was the second most affected country in terms of burnt area in 2018, after Turkey. However, the total amount of damage was a fraction of the amount recorded in 2017. 83 fires over 30 ha burned a total of 37 146 ha, less than 7% of 2017's total and the lowest mapped since 2014. Although fires were recorded from February to November, practically all the damage resulted from a single fire in the Monchique (Algarve region) in August, which burnt 27 635 ha and which alone accounts for three-quarters of Portugal's annual total (Figure 29). There were only 5 other fires over 500 ha (compared with 59 over 1000 ha in 2017).

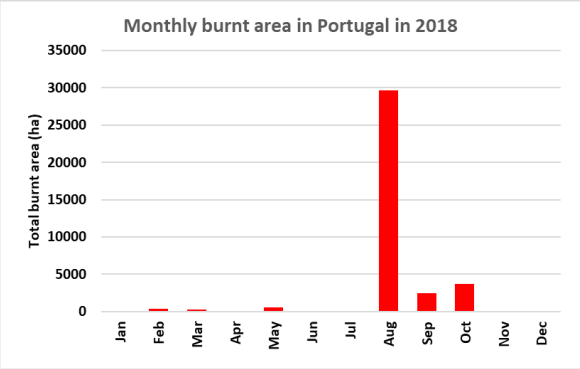
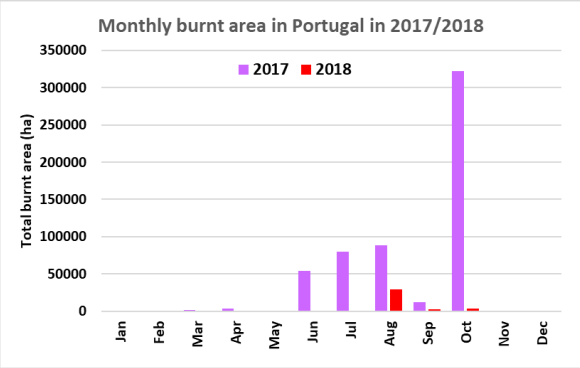


Figure 29. Monthly burnt area in Portugal in 2018.

The Monchique fire was also the largest fire mapped anywhere across Europe, Middle East and North Africa in 2018, and covered the same area as the next 10 largest fires combined.

However, to put this in perspective, the same data are reproduced below in comparison with the 2017 mapped monthly burnt areas in Portugal.



The mapped burnt areas in Portugal in 2018 can be seen in Figure 30.

22 079 ha of the burnt area mapped in 2018 occurred on Natura2000 sites, corresponding to 59% of the total area burnt, and 1.155 % of the total Natura2000 areas in Portugal.

The distribution of the mapped burnt area by land cover type is shown in Table 24. Forest and Other Wooded Land was heavily affected, accounting for 80% of the mapped burnt area.

Table 24. Distribution of burnt area (ha) in Portugal by land cover types in 2018.

Land cover	*Area burned*	*% of total*
Forest/Other Wooded Land	29925.52	80.56
Other Natural Land	3968.11	10.68
Agriculture	3173.21	8.54
Artificial Surfaces	73.55	0.2
Other Land Cover	5.88	0.02
TOTAL	**37146.26**	**100**

Figure 30. Burnt area scars in Portugal in 2018.

1.2.20 Romania

After the worst fire season seen for several years in 2017, the 2018 season in Romania was relatively quiet and close to the long term average (excluding 2017). There were 42 fires over 30 ha burning a total of 3341 ha between February and November, but nearly half of the damage occurred late in the year in November (Figure 31). Of the total, 1 293 ha (39%) of the mapped burnt area was on Natura2000 sites, a lower proportion than in recent years. This represents 0.03% of the total Natura2000 area of Romania. Table 25 presents the distribution of the mapped burnt area by land cover type.

Table 25. Distribution of burnt area (ha) in Romania by land cover types in 2018.

Land cover	*Area burned*	*% of total*
Forest/Other Wooded Land	1448.55	43.36
Other Natural Land	753.24	22.55
Agriculture	1123.62	33.63
Artificial Surfaces	12.65	0.38
Other Land Cover	2.89	0.09
TOTAL	**3340.95**	**100.01**

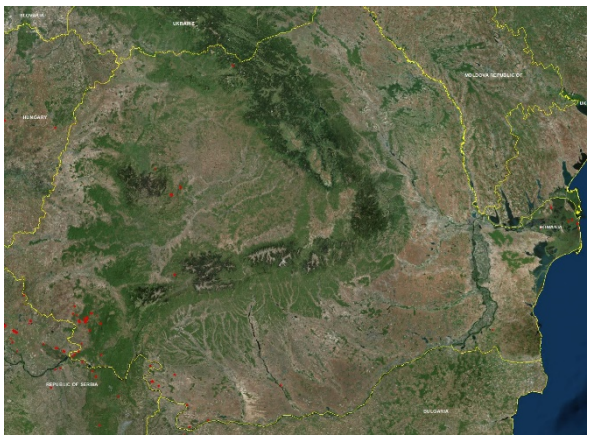


Figure 31. Burnt area scars in Romania in 2018.

1.2.21 Serbia

The fire season in Serbia was better than that of 2017, although above the low amounts mapped in 2013-5. There were 46 fires over 30 ha, burning a total of 5 800 ha. Fires were mapped from April to November, but most of the damage occurred late in the year in October and November.

Table 26 presents the breakdown of burnt area by land cover type. Figure 32 shows the location of these fires.

Table 26. Distribution of burnt area (ha) in Serbia by land cover type in 2016.

Land cover	*Area*	*% of total*
Forest/Other Wooded Land	1770.71	30.53
Other Natural Land	2800.31	48.28
Agriculture	1199.63	20.68
Other Land Cover	29.22	0.5
TOTAL	**5799.86**	**100**

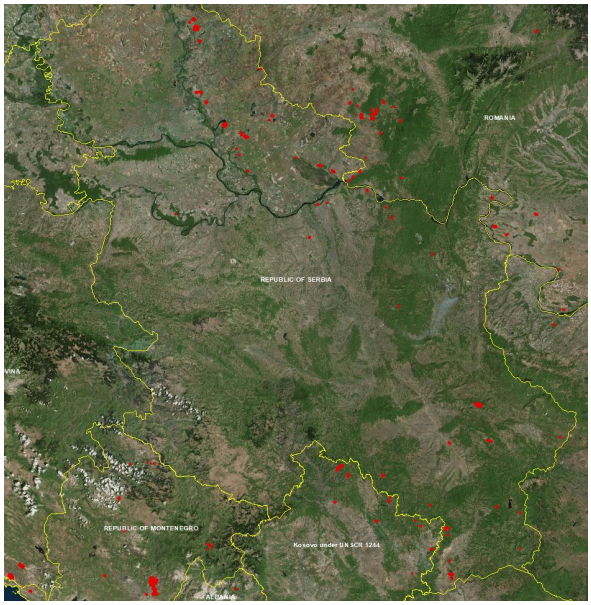


Figure 32. Burnt area scars in Serbia in 2018.

1.2.22 Spain

After a bad year in 2017, Spain recorded the lowest burnt area since 2008. There were 90 fires over 30 ha resulting in a total burnt area of 11 640 ha, less than 10% of the previous year's total. Although fires were mapped in every month of the year, 50% of the damage occurred in August, mostly because of two very large fires that occurred in Valencia (3 228 ha) and Huelva (1 744 ha) regions.

Of the total burnt area mapped in 2018, 4 815 ha were on Natura2000 sites, corresponding to 41% of the total area burned, and 0.035% of the Natura2000 areas in Spain. Table 27 presents the distribution of the mapped burnt area by land cover type. The most noticeable fires in Spain during 2018 are shown in Figure 34.

Table 27. Distribution of burnt area (ha) in Spain by land cover type in 2018.

Land cover	*Area burned*	*% of total*
Forest/Other Wooded Land	8275.03	71.09
Other Natural Land	2376.75	20.42
Agriculture	827.44	7.11
Artificial Surfaces	144.2	1.24
Other Land Cover	16.3	0.14
TOTAL	**11639.72**	**100**

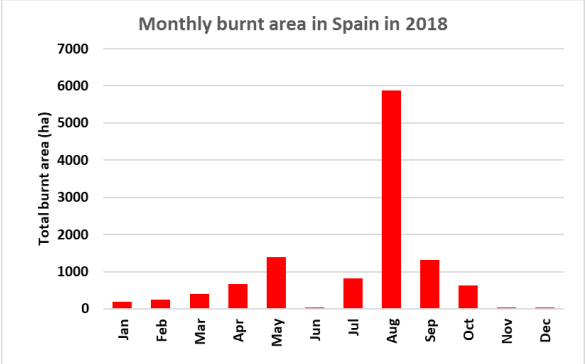


Figure 33. Monthly evolution of burnt area in Spain in 2018.

Figure 34. Burnt area scars in the Iberian Peninsula in 2018.

1.2.23 Sweden

Sweden had the worst fire season in memory. The total burnt area of 21 605 ha from 74 fires over 30 ha registered as the third highest of the year after Turkey and Portugal, an unusual ranking for a northern country.

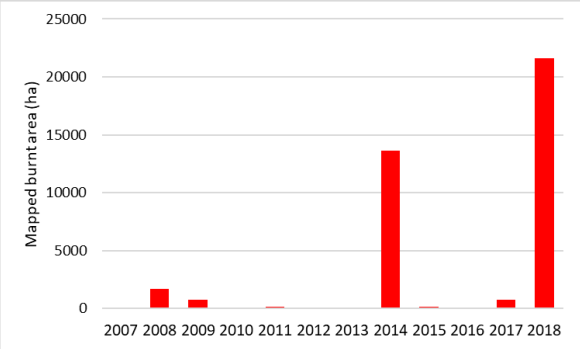


Figure 35.Total mapped burnt area in Sweden 2007-2018.

Fires were mapped from May to September, although practically all the damage occurred in the second half of the season. The third largest fire of 2018 occurred in Sweden and covered nearly 4 000 ha in Jamtlands Ian in July.

Although this is not as large as the fire that occurred in Sweden in 2014 (over 12 000 ha), the difference in 2018 was that the burnt area resulted from numerous fires as opposed to one single large outlier.

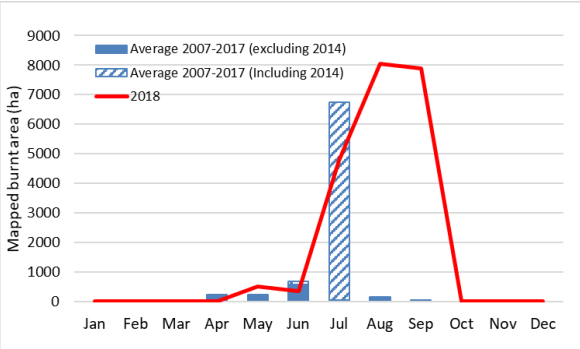


Figure 36. Monthly mapped burnt area in Sweden compared with long-term average (with and without outlying year 2014).

Most of the burnt area occurred in Forest and Other Wooded Land (Table 28).

Table 28. Distribution of burnt area (ha) in Sweden by land cover types in 2018.

Land cover	*Area burned*	*% of total*
Forest/Other Wooded Land	19458.27	90.06
Other Natural Land	2108.13	9.76
Agriculture	18.64	0.09
Other Land Cover	19.79	0.09
TOTAL	**21604.82**	**100**

Of the total burnt area mapped, 361 ha occurred on Natura2000 sites, amounting to 1.7% of the total and 0.006% of the Natura2000 area of the country. Ost of the Natura2000 land cover affected was in Coniferous forest.

Burnt area scars of the fires mapped in Sweden in 2018 are shown in Figure 37.

Figure 37. Burnt area scars in Sweden in 2018.

1.2.24 Switzerland

In September a fire of 26.27 ha was mapped, affecting mostly forest and Other Wooded Land.

Table 29. Distribution of burnt area (ha) in Switzerland by land cover types in 2018.

Land cover	*Area burned*	*% of total*
Forest/Other Wooded Land	25.05	95.37
Artificial surfaces	1.22	4.63
TOTAL	**26.27**	**100**

1.2.25 Turkey

Despite being the country most affected by fires over 30 ha in 2017, with 40 678 ha mapped from 271 fires over 30 ha, Turkey's fire season was its best since 2014. The burnt area total was slightly less than last year and one third of that recorded in 2016. Fires were mapped from February to November, but the majority occurred between July and September.

Unlike previous years, Forest and Other Wooded Land was the most affected land type. Table 30 presents the distribution of the mapped burned area by land cover type. The visible scars from forest fires in the south-east of the country are shown in Figure 38.

Table 30. Distribution of burnt area (ha) in Turkey by land cover types in 2018.

Land cover	*Area burned*	*% of total*
Forest/Other Wooded Land	19783.71	48.63
Other Natural Land	17360.34	42.68
Agriculture	3516.62	8.64
Artificial Surfaces	7.73	0.02
Other Land Cover	9.76	0.02
TOTAL	**40678.15**	**99.99**

Figure 38. Burnt area scars in Turkey in 2018.

1.2.26 United Kingdom

In common with other more northerly countries, it was a bad year for the UK, which was the fourth most affected country in 2018. There were 79 fires of over 30 ha, which burned a total of 18 032 ha, the most for at least 7 years. In addition to the usual large fires seen in Scotland early in the season there were others in later months, including one on Saddleworth Moor in July, which burned over 1 000 ha and was of particular concern because of its proximity to Manchester. There were 10 fires of more than 500 ha. Of the total, 5870 ha occurred on Natura2000 land, amounting to 32.6% of the total burnt area and 0.333% of the Natura2000 land in the UK. After Portugal, this was the greatest loss of Natura2000 land in the 2018 season. Other Natural Land was by far the most affected land type (Table 31).

Table 31. Distribution of burnt area (ha) in the UK by land cover types in 2018.

Land cover	*Area burned*	*% of total*
Forest/Other Wooded Land	800.31	4.44
Other Natural Land	17075.73	94.7
Agriculture	76.51	0.42
Artificial Surfaces	79.69	0.44
Other Land Cover	0.01	0
TOTAL	**18032.25**	**100**

Figure 39. Burnt area scars in the UK in 2018.

1.3 Middle East and North Africa

The 2017 fire season in North Africa and the Middle East was significantly better than average, with a total burnt area recorded over the region of 5 973 ha, just over 5% of the average over the past 8 years.

1.3.1 Algeria

Algeria's fire season was the best for 10 years, with only 21 fires over 30 ha mapped. A total of 1716 ha were affected, only around 2% of the long term average. Most of the fires occurred in July and August and only 27 ha affected protected areas. The burnt scars left by these fires can be seen in Figure 40 below. The Globcover land cover map from ESA was used to split the burnt area into different land type categories, harmonised with CLC terminology, and the distribution of burnt area by these land cover types is given in Table 32.

Table 32. Distribution of burnt area (ha) in Algeria by land cover types in 2017.

Land cover	*Area burned*	*% of total*
Forest/Other Wooded Land	889.13	51.81
Other Natural Land	295.34	17.21
Agriculture	500.54	29.17
Artificial Surfaces	31.08	1.81
TOTAL	**1716.09**	**100**

1.3.2 Iraq

A fire of 116 ha was mapped in Iraq in June.

1.3.3 Israel

There were two fires over 30 ha mapped in Israel, one in May and the other in July, burning a total of 105 ha.

Table 33. Distribution of burnt area (ha) in Israel by land cover types in 2018.

Land cover	*Area burned*	*% of total*
Forest/Other Wooded Land	21.17	20.11
Other Natural Land	46.18	43.86
Agriculture	37.94	36.03
TOTAL	**105.3**	**100**

1.3.4 Lebanon

In Lebanon two fires in July and August burned 74 ha, a slight increase on the 2017 figures. Table 34 presents the distribution of the mapped burnt area by land cover type using the Globcover land cover map, harmonised with CLC.

Table 34. Distribution of burnt area (ha) in Lebanon by land cover types in 2018.

Land cover	*Area burned*	*% of total*
Forest/Other Wooded Land	16.78	22.64
Other Natural Land	17.07	23.03
Agriculture	40.28	54.33
TOTAL	**74.14**	**100**

1.3.5 Libya

There were four fires over 30 in Libya in May and June, covering a total of 273 ha, a slight increase on 2017. Table 35 presents the distribution of the mapped burnt area by land cover type using the Globcover land cover map, harmonised with CLC.

Table 35. Distribution of burnt area (ha) in Libya by land cover types in 2018.

Land cover	*Area burned*	*% of total*
Forest/Other Wooded Land	170.71	62.65
Agriculture	101.77	37.35
TOTAL	**272.48**	**100**

Figure 40. Burnt area scars in eastern Algeria and Tunisia in 2018.

1.3.6 Morocco

Morocco's fire season was better than the previous two years. 17 fires burned a total of 1 133 ha between February and August, around a third of the 10-year average. Of the annual total, 217 ha occurred in Protected Areas, amounting to 19% of the total burnt in the year and 0.028% of the total protected areas of the country. The distribution of burnt area by land cover types, using Morocco's own land cover map but with terminology harmonised with CLC, is given in Table 36 and the burnt area scars left by the fires are shown in Figure 41.

Table 36. Distribution of burnt area (ha) in Morocco by land cover types in 2018.

Land cover	*Area burned*	*% of total*
Forest/Other Wooded Land	889.07	78.5
Other Natural Land	13.67	1.21
Agriculture	229.9	20.3
TOTAL	**1132.64**	**100.01**

Figure 41. Burnt area scars in Morocco in 2018.

1.3.7 Syria

Syria's total mapped burnt area was the lowest since 2011. Fires were mapped from May to September, but 90% of the damage occurred between June and August. There were 22 fires of over 30 ha, resulting in a total burnt area of 1 571 ha. The Globcover land cover map, harmonised with CLC, was used to split the burnt area into different land type categories. Table 37 shows the distribution of burnt area in Syria by land type.

Table 37. Distribution of burnt area (ha) in Syria by land cover types in 2018.

Land cover	*Area burned*	*% of total*
Forest/Other Wooded Land	1109.94	70.67
Other Natural Land	29.93	1.91
Agriculture	430.72	27.42
TOTAL	**1570.59**	**100**

1.3.8 Tunisia

In Tunisia it was the best year for forest fires since 2009, with a total burnt area only 5% of that mapped in 2017. There were 6 fires greater than 30 ha recorded in July and August burning a total of 986 ha, although 95% of the damage occurred in July. Figure 40 above shows the burnt scars left by these fires. The distribution of burnt area by land cover types using Tunisia's own land cover map but with terminology harmonised with CLC, is given in Table 38.

Table 38. Distribution of burnt area (ha) in Tunisia by land cover types in 2018.

Land cover	*Area burned*	*% of total*
Forest/Other Wooded Land	979.41	99.32
Other Natural Land	4.67	0.47
Agriculture	1.49	0.15
Other Land Cover	0.52	0.05
TOTAL	**986.09**	**100**

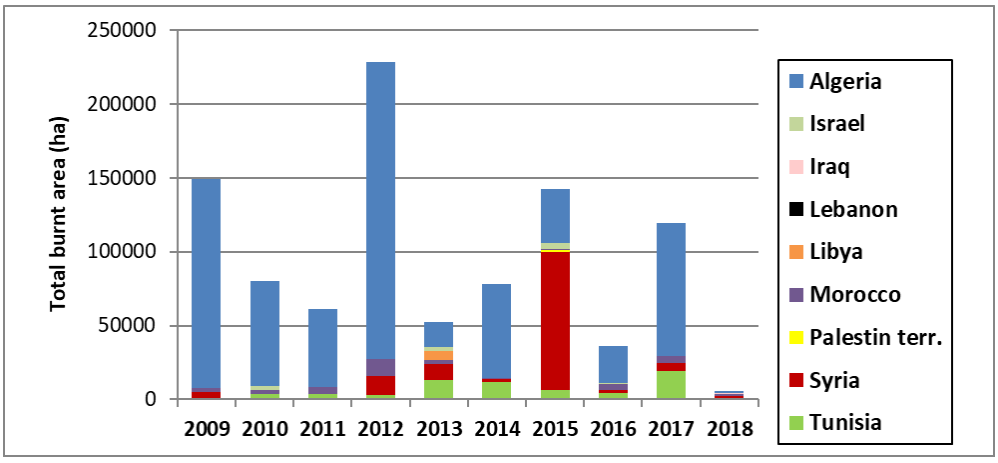


Table 39. Overview of fires in the MENA region in the last 10 years.

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